

Specifications and Tolerances Committee Interim Agenda

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300 INTRODUCTION

The Specifications and Tolerances (S&T) Committee ("Committee") will address the following items at its Interim Meeting. All items are listed below in Table A by Reference Key Number. The headings and subjects apply to NIST Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices." The Appendices to the Report are listed in Table B. The acronyms for organizations and technical terms used throughout the agenda are identified in a glossary in Table C. In some cases background information will be provided for an item. The fact that an item appears on the agenda does not mean that the item will be presented to the Conference for a vote. The Committee will review its agenda at the Interim Meeting and may withdraw some items, present some items for information meant for additional study, issue interpretations, or make specific recommendations for change to NIST Handbook 44 which will be presented for a vote at the Annual Meeting.

The recommendations are statements of proposals and are not necessarily those of the Committee. Suggested revisions to the handbook are shown in **bold face print** by ~~striking out~~ information to be deleted and underlining information to be added. Requirements that are proposed to be nonretroactive are printed in **bold-faced italics**.

Note: The policy of NIST is to use metric units of measurement in all of its publications; however, recommendations received by the NCWM technical committees have been printed in this publication as they were submitted and may, therefore, contain references to inch-pound units.

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Table C
Glossary of Acronyms

CC	Certificate of Conformance	NIST	National Institute of Standards and Technology
CWMA	Central Weights and Measures Association	NTEP	National Type Evaluation Program
EPO	Examination Procedure Outline	NTETC	National Type Evaluation Technical Committee
GPMA	Gasoline Pump Manufacturers Association	RMFD	Retail Motor-Fuel Dispenser
LMD	Liquid-Measuring Device	SMA	Scale Manufacturers Association
LPG	Liquefied Petroleum Gas	SWMA	Southern Weights and Measures Association
MMA	Meter Manufacturers Association	VTM	Vehicle-Tank Meter
MFM	Mass Flow Meter	WMD	Weights and Measures Division
NCWM	National Conference on Weights and Measures	WWMA	Western Weights and Measures Association
NEWMA	Northeastern Weights and Measures Association, Inc.		
“Handbook 130” means the 2006 Edition of NIST Handbook 130 “Uniform Laws and Regulations in the areas of legal metrology and fuel quality.”			
Note: NIST does not imply that these acronyms are used solely to identify these organizations or technical topics.			

**Details of All Items
(In Order by Reference Key Number)**

310 GENERAL CODE

310-1 G-S.1. (d) Identification ; Software for Not-Built-for-Purpose Devices

Source: Western Weights and Measures Association (WWMA)

Recommendation: Modify paragraph G-S.1. (d) as follows:

G-S.1. Identification. - All equipment, except weights and separate parts necessary to the measurement process but not having any metrological effect, shall be clearly and permanently marked for the purposes of identification with the following information:

- (a) the name, initials, or trademark of the manufacturer or distributor;
- (b) a model designation that positively identifies the pattern or design of the device;
 - 1. *The model designation shall be prefaced by the term "Model," "Type," or "Pattern." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.). The abbreviation for the word "Model" shall be "Mod" or "Mod." Prefix lettering may be initial capitals, all capitals or all lower case.*
[Nonretroactive as of January 1, 2003]
(Added 2000) (Amended 2001)
- (c) a nonrepetitive serial number, except for equipment with no moving or electronic component parts and not-built-for-purpose, software-based devices;
[Nonretroactive as of January 1, 1968]
(Amended 2003)
 - 1. *The serial number shall be prefaced by words, and an abbreviation, or a symbol, that clearly identifies the number as the required serial number.*
[Nonretroactive as of January 1, 1986]
 - 2. *Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No., and S. No.).*
[Nonretroactive as of January 1, 2001]
- (d) the current software version designation for not-built-for-purpose, software- based devices;
[Nonretroactive as of January 1, 2004]
(Added 2003)
 - 1. *The version designation shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required version designation.*
[Nonretroactive as of January 1, 200X]
(Added 200X)
 - 2. *Abbreviations for the word "Version" shall, as a minimum, begin with the letter "V" and may be followed by the term Number or Designation or an abbreviation of these terms. The abbreviation*

for the term "Number" shall, as a minimum, begin with the letter "N." The abbreviation for the term "Designation" shall, as a minimum, begin with the letter "D" (e.g., V/N, VN, Ver. No., and V. No., V/D, VD, Ver. Des., and V.Des.).

[Nonretroactive as of January 1, 200X]
(Added 200X)

- (e) an NTEP Certificate of Conformance (CC) number or a corresponding CC Addendum Number for devices that have a CC. The CC Number or a corresponding CC Addendum Number shall be prefaced by the terms "NTEP CC," "CC," or "Approval." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.)
[Nonretroactive as of January 1, 2003]

The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.
(Amended 1985, 1991, 1999, 2000, 2001, and 2003)

Discussion: At its September 2005 Annual Meeting, the WWMA reviewed a proposal to add requirements for identifying the required software version designation in paragraph G-S.1. with acceptable words, abbreviations, or symbols. This is consistent with the current requirements to identify other required markings such as the serial number or model designation. The WWMA modified the original proposal and agreed to forward the modified version as shown above to the Committee for consideration.

At its 2005 fall meeting, the CWMA agreed with the intent of the WWMA proposal, but suggested that the word "designation" for software be changed to "identification." NEWMA supported the WWMA proposal as a developing item. The SWMA recommended the proposal be a voting item on the Committee's 2006 agenda.

310-2 G-S.1.1. Location of Marking Information for Not-Built-for-Purpose Software-Based Devices

Source: Western Weights and Measures Association (WWMA)

Recommendation: Modify paragraph G-S.1.1. as follows:

G-S.1.1. Location of Marking Information for Not-Built-For-Purpose, Software-Based Devices. - For not-built-for-purpose, software-based devices, the following shall apply: required information in G-S.1. Identification. (a), (b), (d), and (e)

~~the manufacturer or distributor and the model designation~~ shall be continuously displayed ~~or marked on the device (see note below), or~~

~~the Certificate of Conformance (CC) Number~~ shall be ~~continuously~~ displayed after the "Help" menu ~~or marked on the device (see note below) has been selected, or~~

~~all required information in G-S.1. Identification. (a), (b), (d), and (h) shall be continuously displayed. Alternatively, a clearly identified "view only" System Identification, G-S.1. Identification, or Weights and Measures Identification shall be accessible through the "Help" menu. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.~~ shall be accessible through the "Help" menu, and if necessary a submenu which shall be identified as "System Identification," "G-S.1. Identification," or "Weights and Measures Identification" or

Note: Clear instructions for accessing the remaining required G-S.1. information shall be listed on the CC. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.

have the G-S.1 identification be permanently marked on the device.

[Nonretroactive as of January 1, 2004]

(Added 2003)(Amended 200X)

Note: Clear instructions for accessing the remaining required G-S.1. information shall be listed on the CC. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.

Discussion : At its September 2005 Annual Meeting, the WWMA reviewed a proposal to modify paragraph G-S.1.1. that clarifies what information must be marked, displayed or accessible through the help menu on not-built-for-purpose software-based devices. The WWMA modified the original proposal and agreed to forward the revised proposal shown above to the Committee for consideration.

At their 2005 fall meetings, the CWMA supported the concept of the WWMA proposal, but suggested the proposal remain a developing item pending input from the new NTETC Software Sector scheduled to begin activities in 2006. The SWMA supported the WWMA proposal, but questioned if the word “Help” is the only word that can be used to identify the function that accesses the weights and measures menu.

310-3 G-S.8.1. Multiple Weighing or Measuring Elements with a Single Provision for Sealing

Source: Western Weights and Measures Association (WWMA)

Recommendation: Add a new paragraph G-S.8.1. as follows:

G-S.8.1. Multiple Weighing or Measuring Elements with a Single Provision for Sealing. - A change to the adjustment of any measuring element shall be individually identified.

[Nonretroactive as of January 1, 200X]

Note: Examples of acceptable identification of a change to the adjustment of a weighing or measuring element include, but are not limited to:

- (1) a broken, missing, or replaced physical seal on an individual measuring element;**
 - (2) a change in a calibration factor for each measuring element;**
 - (3) a display of the date of or the number of days since the last calibration event for each measuring element; or**
 - (4) a counter indicating the number of calibration events per measuring element.**
- (Added 200X)**

Discussion: At its September 2005 Annual Meeting, the WWMA reviewed a proposal to add to all the liquid-measuring devices codes requirements for identifying when an adjustment is made to any measuring element in a device which has multiple measuring elements but that is only equipped with a single provision for sealing. The proposed requirement is similar to the requirements in Section 3.30. Paragraph S.2.2.1. The submitter of the proposal suggested an alternative approach in which the requirement would be added to the General Code to address all weighing and measuring devices. The WWMA favored the alternative proposal to modify the General Code and received no opposition from either the weighing industry or the measuring industry representatives present at the meeting. Therefore, the WWMA agreed to forward the proposal to the Committee for consideration.

At their 2005 fall meetings, the CWMA and the SWMA both supported the proposal and recommended it be added to the Committee’s 2006 Agenda.

310-4 G-T.1. (e) Acceptance Tolerances

Source: Carryover Item 310-2. (This item originated from the National Type Evaluation Technical Committee (NTETC) Measuring Sector and first appeared on the Committee’s 2005 agenda.)

Recommendation: Modify paragraph G-T.1. (e) as follows:

G-T.1. Acceptance Tolerances. - Acceptance tolerances shall apply to:

- (a) equipment to be put into commercial use for the first time;
- (b) equipment that has been placed in commercial service within the preceding 30 days and is being officially tested for the first time;
- (c) equipment that has been returned to commercial service following official rejection for failure to conform to performance requirements and is being officially tested for the first time within 30 days after corrective service;
- (d) equipment that is being officially tested for the first time within 30 days after major reconditioning or overhaul; and
- (e) equipment undergoing type evaluation (**special test tolerances are not applicable**).
(Amended 1989 **and 200X**)

Discussion/Background: At its October 2004 meeting, the NTETC Measuring Sector noted that the intent of paragraph G-T.1. (e) is to specify that acceptance tolerances apply to all equipment undergoing type evaluation; however, the language is not clear regarding what tolerance would apply during “special tests.”

Special test tolerances are intended to recognize that a larger tolerance for test drafts conducted under certain conditions, such as at a slow flow rate, is appropriate. Normal wear of the measuring elements frequently produces larger performance errors at a slow flow rate, compared to performance errors at full flow rate. The Sector agreed that devices submitted for NTEP evaluation should be held to a higher standard than devices in normal service and special test tolerances should not be applicable during an NTEP evaluation.

At the 2005 NCWM Annual Meeting, the MMA indicated they had not understood that the proposal submitted to the Committee from the Measuring Sector would apply to all types of liquid-measuring devices submitted for NTEP evaluation. The MMA thought the proposed requirement would apply only to retail motor-fuel dispensers. The MMA stated that without special test tolerances, most meters, especially those installed in vehicle-mounted applications, would not meet tolerances for tests conducted at lower flow rates during both field and NTEP evaluations. The Committee agreed to make the proposal an information item to allow the MMA and the Measuring Sector additional time to develop the proposal.

At its October 2004 meeting, the NTETC Measuring Sector agreed to forward a recommendation to the Committee that it withdraw this item and instead amend Section 3.30 as shown in Item 330-4.

In 1991 this issue was brought before the NCWM as an informational item. The intent at that time was to provide guidance for states in the interpretation of General Code Paragraph G.UR.4.1. Maintenance of Equipment. In 1993, the State of Wisconsin adopted a policy that defined predominance. That policy was similar to the one proposed in 1991 except that Wisconsin was felt that one-third acceptance tolerance was too stringent as there was a need to take into account normal variability in testing procedures, equipment, and environmental conditions found in the field. Wisconsin therefore adopted a greater than one-third of maintenance tolerance guideline. In 2003 the Wisconsin policy was further defined by deleting the language “all devices are found to be in error in a direction favorable to the device user.” And “Sixty percent or more of the devices are found to be in error in favor of the device owner/user by more than one-third of the maintenance tolerance.” Both of these criteria were seldom used in the field because they made the policy confusing.

Recently NIST conducted a national survey of RMFD testing and the results point to a need to gain more uniformity in the application of tolerances. There is a wide variation in how different states handle the “predominance” question. Strides should be continually made to gain uniformity. It is felt that the adoption of the proposed requirement G-UR.4.1.1. would be one step toward gaining greater uniformity. With more than 5 years of history Wisconsin sees a relatively low number of devices rejected on the basis of “predominance” and most station owners and all service companies have a working understanding of predominance.

At its September 2005 Interim Meeting, the CWMA reviewed a proposal to add a new paragraph G-UR.4.1.1. Proper Operating Condition to the General Code Section of NIST Handbook 44. The CWMA agreed with the proposal, but modified the original proposal by changing the word “device” to “equipment” in the first sentence as shown above. The CWMA agreed to submit the proposal with a recommendation that it be a voting item on the Committee’s 2006 Agenda.

320 SCALES

320-1 S.1.1. (c) Zero Indication; Requirements for Markings or Indications for Other than Digital Zero Indications

Source: Carryover Item 320-1. (This item originated from the Committee and first appeared on its 2004 agenda.)

Recommendation: Amend paragraph S.1.1. (c) as follows:

S.1.1. Zero Indication.

- (a) On a scale equipped with indicating or recording elements, provision shall be made to either indicate or record a zero-balance condition.
- (b) On an automatic-indicating scale or balance indicator, provision shall be made to indicate or record an out-of-balance condition on both sides of zero.
- (c) A zero-balance condition may be indicated by other than a continuous digital zero indication, provided that an effective automatic means is provided to inhibit a weighing operation or to return to a continuous digital indication when the scale is in an out-of-balance condition **and is marked or includes supplemental indications or markings to indicate that the “other than digital zero indication” represents a no-load condition of the scale.**

Added 1987 (Amended 1993 **and 200X**)

[Note: The markings or supplemental indications in S.1.1.(c) are not required if, prior to the start of a transaction: (1) operator intervention is required to verify the zero balance condition with a digital zero indication, or (2) the scale automatically represents the zero-balance condition with a digital zero indication.]

(Added 200X)

(Amended 1987)

Background/Discussion: Past inconsistencies and ongoing disagreements about the interpretation of paragraph S.1.1.(c) warranted an effort to clarify the intent of the requirement. The proposed changes to the requirement specify that all primary indicators on scales that use anything other than a digital zero indication (e.g., scrolling messages, dashes, etc.) to indicate zero require additional markings or indications to inform customers that the scales are at a zero-balance condition. No markings are necessary on these devices when operator intervention is required to return the indication to a digital zero before conducting a transaction.

The Committee agreed that General Code paragraphs G-S.6. Marking Operational Controls, Indications, and Features, and S.1.1. require weighing devices to be marked or provide an indication that states the zero-balance is represented by other than a digital zero indication. Historically, this position is supported by the 1993 amendment to paragraph S.1.1.(c) as well as type evaluation requirements and other requirements adopted to ensure that customers have sufficient information about displays and recorded transaction information to make an informed decision during a direct sale transaction.

At the July 2005 NCWM Annual Meeting, the Committee changed the status of the item from “voting” to “information” to allow additional time to determine: (1) if the proposed markings could be displayed as part of the indication rather than being physically marked on the device and (2) if self-service systems provide information on the zero-load condition of the scale prior to each weighing.

In the fall of 2005, several regional associations and the NTETC Weighing Sector reconsidered the proposal. After hearing opposition to the proposal from the Scale Manufacturers Association, the WWMA indicated that the proposal should remain an information item pending a review by the Weighing Sector. The CWMA restated its earlier position that the proposal should be withdrawn because appropriate protections and labeling criteria are applied during type evaluation. A majority of the Sector's membership voted against the proposal because they do not believe labeling is necessary if a scale has an automatic means to inhibit a transaction when it is out-of-balance.

For more background information, refer to the 2004 and 2005 S&T Final Reports.

320-2 S.1.4.6. Height and Definition of Minimum Reading Distance, UR.2.10. Primary Indicating Elements Provided by the User, UR.2.11. Minimum Reading Distance, and Definitions of Minimum Reading Distance and Primary Indications

Source: National Type Evaluation Technical Committee Weighing Sector

Recommendation: Add a new paragraphs S.1.4.6., UR.2.10., and UR.2.11. to the Scales Code.

S.1.4. Indicators.

S.1.4.6. Height. - All primary indications shall be indicated clearly and simultaneously.

(a) On digital devices that display primary indications during direct sales to the customer, the numerical figures displayed to the customer shall be at least 9.5 (1/3 in) mm high.

(b) The units of mass and other descriptive markings or indications, such as lb, kg, gross, tare, net, etc., shall be clearly and easily read and shall be at least 2 mm high.

[Nonretroactive as of January 1, 2007]

(Added 200X)

UR.2. Installation Requirements

UR.2.10. Primary Indicating Elements Provided by the User. – Primary indicating elements that are not the same as the primary indicating elements provided by the original equipment manufacturer (e.g. video display monitors) shall comply with the following:

(a) On digital devices that display primary indications during direct sales to the customer, the numerical figures displayed to the customer shall be at least 9.5 mm high.

(b) The units of mass and other descriptive information, such as gross, tare, net, etc., shall be displayed or marked on the device and shall be at least 2 mm high.

UR.2.11 Minimum Reading Distance - On digital devices that display primary indications, the height of the numbers expressed in millimeters should be not less than 3 times the minimum reading distance expressed in meters, without being less than 2 mm. (Example: If the height of the primary indications is 10 mm, then the minimum reading distance should not be greater than 30 m).

Add new definitions of “minimum reading distance” and “primary indications” to Appendix D as follows:

minimum reading distance. The shortest distance that an observer is able freely to approach the indicating device to take a reading under normal conditions of use. This approach is considered to be free for the observer if there is a clear space of at least 0.8 m in front of the indicating device. However, if the minimum reading distance “S” in figure X is less than 0.8 m, then the minimum reading distance is “L” in figure X. [2.20]

(Added 200X)

primary indications. Weight or other units of measurement values that are displayed by a primary indicating element. The primary indications are used as the determining factor in arriving at the sale representation when the device is used commercially. (Examples of primary indications include the measurement value, unit price or count, and total price on instruments capable of price computing. Primary indications do not include indications from auxiliary indicating devices such as totalizing registers and pre-determined stop mechanisms.) [1.10], [2.20]

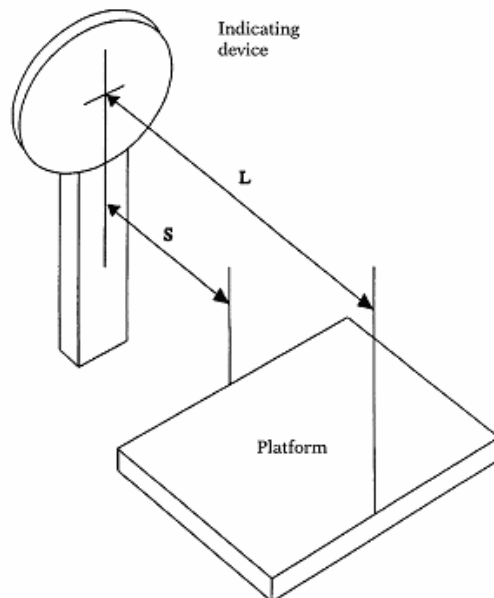


Figure X

(Added 200X)

Discussion: The size of weight indications and the values that define transaction information are becoming increasingly small, as demonstrated in the following example of a weight display where the actual size of the weight values are 9.5 mm in height, but the unit of measurement (g) is 4 mm in height.



How does the field and laboratory official determine if indications are suitable for the environment in which the device is used? The Weighing Sector developed and voted on a proposal which provides guidelines for determining whether or not indications are appropriate in a particular installation. OIML R76 requirements for visibility of indications to the customer in direct sale applications, minimum height of lettering for identification information, and the minimum height of numbers for analog indicating devices were used in developing the proposed language. The Weighing Sector ballot was developed as two voting items. The first voting item proposed a new paragraph S.1.4.6. Height (of indicator) and a

new definition for “primary indications.” The result of the first voting item was eight in favor and two opposed to the proposed language. The comments opposing the item stated that the minimum 2 mm height for the “units” indication was too small to be clearly read under normal conditions. The second voting item proposed two new user requirements that provided additional guidelines for installations that use not-built-for-purpose separable indicating elements and guidelines on establishing on the minimum reading distance based on the size of the primary weight indications, and a new definition for minimum reading distance. The result of the second voting item was four in favor and two opposed to the proposed language. The comments opposing the item stated that it would be difficult for field officials to enforce the “minimum reading distance” and that the example is confusing and does not reflect what is in the proposed language.

Currently only the Taximeters, Grain Moisture Meters, and Near-Infrared Grain Analyzers Codes include requirements that specify the minimum height of figures, words, and symbols. NIST Handbook 44 and NCWM Publication 14 include no uniform size requirements or guidelines on how to evaluate display information for clarity and readability. The size requirements for all three device technologies were developed primarily because of concerns about the visibility of indications from the customer’s position.

In 1999, a similar proposal to amend General Code paragraph G-S.5.2.3 Size and Character to include minimum height requirements was considered, but later withdrawn. GPMA expressed strong opposition to the 1999 proposal because many of their devices were equipped with quantity displays that would not meet the proposed 9.5 mm size requirement. Officials need uniform guidelines that are not ambiguous as to which transaction information must meet size requirements. It was felt that any future proposals should address a specific device technology since it is difficult to address all device configurations and the environmental conditions that exist at each installation site.

320-3 N.1.3.1. Bench or Counter Scales, N.1.3.8. All Other Scales Except Crane Scales, Hanging Scales, Hopper Scales, Wheel-Load Weighers, and Portable Axle-Load Weighers, and Appendix D; Definitions of Bench Scale and Counter Scale

Source: Carryover Item 320-6. (This item originated from the National Type Evaluation Technical Committee (NTETC) Weighing Sector and first appeared on the Committee’s 2005 agenda.)

Recommendation: Delete paragraph N.1.3.1. and renumber subsequent paragraphs.

N.1.3. Shift Test.

~~**N.1.3.1. Bench or Counter Scales.** — **A shift test shall be conducted with a half-capacity test load centered successively at four points equidistant between the center and the front, left, back, and right edges of the load-receiving element.**~~

Renumber and amend paragraph N.1.3.8. All Other Scales Except Crane Scales, Hanging Scales, Hopper Scales, Wheel-Load Weighers, and Portable Axle-Load Weighers as follows:

N.1.3.87. All Other Scales Except Crane Scales, Hanging Scales, Hopper Scales, Wheel-Load Weighers, and Portable Axle-Load Weighers. A shift test shall be conducted using the following prescribed test loads and test patterns.

(a) ~~For livestock scales, the~~ **with a nominal capacity greater than 150 kg (300 lb), a shift test load shall not exceed one-half the rated section may be conducted by either using one-third nominal capacity or one-half the rated concentrated load test load centered as nearly as possible at the center of each quadrant of the load-receiving element as shown in Figure 1 below, or by using one-quarter nominal capacity, whichever is applicable. A shift test shall be conducted using either: load centered as nearly as possible, successively over each corner of the load-receiving element as shown in Figure 2 below.**

(ab) ~~A one-quarter~~ **For scales with a nominal capacity of 150 kg (300 lb) or less, a shift test load shall be conducted using one-third nominal capacity test load. The centered as nearly as possible, successively over each main load shall be applied centrally in the quadrant if a single weight is used, or applied uniformly over the quadrant if several weights are used, support as shown in the diagram below; or**

~~(bc) A one-half nominal capacity~~ For livestock scales, the shift test load ~~centered as nearly as possible, successively at the center of each quarter of the load-receiving element shall not exceed one-half the rated section or concentrated load capacity using the prescribed test pattern~~ as shown in the diagram Figure 1, or one-quarter the section or concentrated load capacity as shown in Figure 2 below.

(Added 2003)

(Amended 1987, ~~and 2003, and 200X~~)

Figure 1

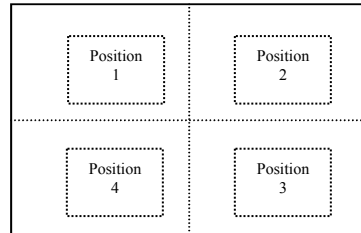
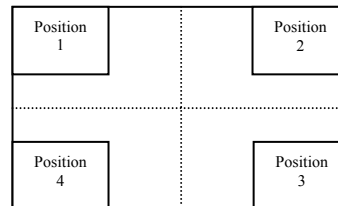


Figure 2



Delete Appendix D definitions for “bench scale” and “counter scale” as follows:

~~bench scale. See “counter scale.” [2.20]~~

~~counter scale. One that, by reason of its size, arrangement of parts, and moderate nominal capacity, is adapted for use on a counter or bench. Sometimes called “bench scale.” [2.20]~~

The CWMA recommended an alternate proposal to modify paragraph N.1.3.8. as follows:

N.1.3.87. All Other Scales Except Crane Scales, Hanging Scales, Hopper Scales, Wheel-Load Weighers, and Portable Axle-Load Weighers. A shift test shall be conducted using the following prescribed test loads and test patterns.

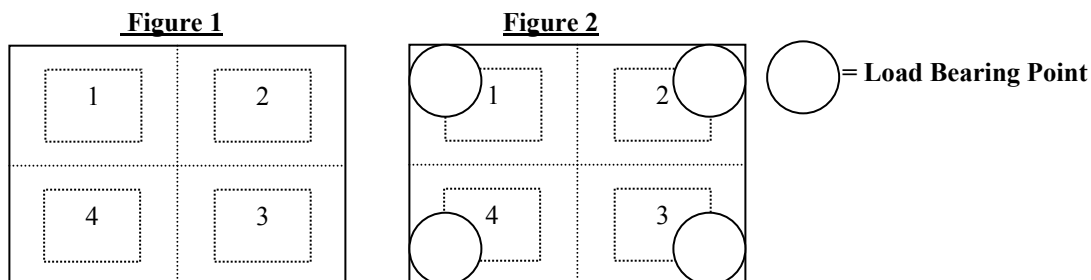
(a) For livestock scales, the with a nominal capacity greater than 150 kg (300 lb) a shift test load shall not exceed one-half the rated section may be conducted by either using one-third nominal capacity or one-half the rated concentrated load test load centered as nearly as possible at the center of each quarter of the load-receiving element as shown in Figure 1 below, or by using one-quarter nominal capacity, whichever is applicable. A shift test shall be conducted using either: load centered as nearly as possible, successively over each corner of the load-receiving element as shown in Figure 2 below.

(ab) A one-quarter For scales with a nominal capacity of 150 kg (300 lb) or less, a shift test load shall be conducted using one-third nominal capacity test load. The centered as nearly as possible, successively over each main load shall be applied centrally in the segment if a single weight is used, or applied uniformly over the segment, if several small weights are used support as shown in the diagram Figure 1 below; or,

(bc) A one-half nominal capacity For livestock scales the shift test load centered as nearly as possible, successively at the center of each quarter of the load-receiving element shall not exceed one-half the rated section or concentrated load capacity using the prescribed test pattern as shown in the diagram Figure 1, or one-quarter of the section or concentrated load capacity as shown in Figure 2 below.

(Added 2003)

(Amended 1987, ~~and 2003, and 200X~~)



Discussion: The proposal is intended to clarify the appropriate shift test pattern and test loads for bench/counter scales and other platform type scales. Currently, bench and counter scale shift tests are conducted with a one-half capacity test load centered successively at four points equidistant between the center and the front, left, back, right edges of the load-receiving element. Other platform scale shift tests are conducted with a one-half capacity test load centered, as nearly as possible, successively at the center of each quadrant. The proposal eliminates references to bench and counter scales and instead prescribes that the shift test load and test pattern used be based on either the scale's nominal capacity or whether or not the scale is used to weigh livestock.

The proposal was kept on the agenda as an information item in response to comments indicating that data should be collected on shift tests to verify that the proposed test loads and positions are equivalent to existing test patterns. In spring 2005, NTEP Laboratories and jurisdictions were asked to send test results to Steve Cook, NIST Technical Advisor to the NTETC Weighing Sector, at steven.cook@nist.gov, by fax at (301) 926-0647 or via mail to NIST WMD, 100 Bureau Drive MS 2600, Gaithersburg, MD 20899-2600.

The WWMA and CWMA encouraged the Committee to keep the proposal an information item until more data could be collected and reviewed by the Weighing Sector, NIST, and the NTEP Laboratories. The Weighing Sector reported that it is still collecting data. For more background information, refer to the Committee's 2005 Final Report.

320-4 **Table 4. Minimum Test Weights and Test Loads**

Source: Northeastern Weights and Measures Association (NEWMA)

Recommendation: Modify Table 4. Minimum Test Weights and Test Loads as follows:

**Table 4.
Minimum Test Weights and Test Loads¹**

Device capacity	Minimums (in terms of device capacity)		(where practicable)
	Test weights (greater of)	Test loads ²	
0 to 150 kg (0 to 300 lb)	100 %		
151 to 1 500 kg (301 to 3 000 lb)	25 % or 150 kg (300 lb)	75 %	Test weights to dial face capacity, 1 000 d, or test load to used capacity, if greater than minimums specified
1 501 to 20 000 kg (3 001 to 40 000 lb)	12.5 % or 500 kg (1 000 lb)	50 %	
20 001 kg± to 250 000 kg (40 001 lb± to 500 000 lb)	12.5 % or 5 000 kg (10 000 lb)	25 % ³	During initial verification, a scale should be tested to capacity.

¹ If the amount of test weight in Table 4 combined with the load on the scale would result in an unsafe condition, then the appropriate load will be determined by the official with statutory authority.

² The term "test load" means the sum of the combination of field standard test weights and any other applied load used in the conduct of a test using substitution test methods. Not more than three substitutions shall be used during substitution testing, after which the tolerances for strain load tests shall be applied to each set of test loads.

³ The scale shall be tested from zero to at least 12.5 % of scale capacity using known test weights, and then to at least 25 % of scale capacity using either a substitution or strain load test that utilizes known test weights of at least 12.5 % of scale capacity. Whenever practical, a strain load test should be conducted to the used capacity of the scale. When a strain load test is conducted, the tolerances apply only to the test weights or substitution test loads.
(Amended 1988, 1989, 1994, ~~and~~ 2003 **and 200X**)

[**Note:** GIPSA requires devices subject to their inspection to be tested to at least "used capacity," which is calculated based on the platform area of the scale and a weight factor assigned to the species of animal weighed on the scale. "Used capacity" is calculated using the formula:

Used Scale Capacity = Scale Platform Area x Species Weight Factor

Where species weight factor = 540 kg/m² (110 lb/ft²) for cattle, 340 kg/m² (70 lb/ft²) for calves and hogs, and 240 kg/m² (50 lb/ft²) for sheep and lambs]

Discussion: Some jurisdictions encounter scales with 1 000 000-lb nominal capacities and must determine the minimum test loads needed to conduct an acceptable test. NEWMA believes that NIST Handbook 44 is flexible but that it does not provide any definitive guidelines on test loads for scales with high capacities. NEWMA modified its original proposal by reducing the scale maximum capacity from 1 000 000 lb to 500 000 lb and removing a footnote that permitted officials to establish the minimum test load. Industry and other regional associations have developed alternate proposals to address their concerns that the original proposal does not address the minimum test weights and test load requirements for a scale with a nominal capacity greater than 500 000 lb.

This issue was part of the Developing Issues agenda. However, the submitter agreed that it was ready for national consideration. In the fall of 2005, three regional weights and measures associations took separate positions on the proposal. The WWMA recommended the proposal remain a developing item. The CWMA recommended withdrawing the proposal since the current table already addresses most installations. NEWMA supports the proposal being on the Committee's 2006 agenda as a voting item.

320-5 **Table 6. Maintenance Tolerances**

Source: Carryover Item 320-7. (This item originated from the NIST Weights and Measures Division (WMD) and first appeared on the Committee's 2005 agenda.)

Recommendation: Amend Table 6 Maintenance Tolerances as follows:

Table 6. Maintenance Tolerances (All values in this table are in <u>verification</u> scale divisions <u>e</u>)				
Tolerance in <u>verification</u> scale divisions <u>e</u>				
	1	2	3	5
Class	Test Load			
I	0 - 50 000	50 001 - 200 000	200 001 +	
II	0 - 5 000	5 001 - 20 000	20 001 +	
III	0 - 500	501 - 2 000	2 001+ - 4 000	4 001+
IIII	0 - 50	51 - 200	201+ - 400	401+
III L	0 - 500	501 - 1 000	(Add 1 de for each additional 500 de or fraction thereof)	

(Amended 200X)

Discussion: The proposal modifies Table 6 in an attempt to return to the original intent of the step tolerances, which was to provide a relationship between scale accuracy and scale resolution. The USNWG agreed that NIST Handbook 44 Class III and Class IIII tolerances should be aligned with OIML R76. Manufacturers have indicated that they build identically performing instruments and load cells for both U.S. and international markets. However, some industry representatives questioned the ability of many scales and load cells with an n_{\max} greater than 5000 e to comply with the temperature effect at zero in U.S. and OIML requirements.

The Class III L tolerance structure in NIST Handbook 44 deviates most from the intent of the step tolerances. For example if a Class III L scale has an $e = 20$ lb, then at 80 000 lb the maintenance tolerance would be $\pm 8 e$, whereas a Class III scale with an $e = 50$ lb would have a $\pm 3 e$ maintenance tolerance at 80 000 lb. The uncertainty when reading indications for the Class III scale where $e = 50$ lb and there is a 150 lb (3 e) allowable error results in a more appropriate relationship than that of the Class III L scale where $e = 20$ lb and there is a 160 lb (8 e) allowable error. It should be noted that the tolerance values, zero-tracking limit, and motion detection requirements in NIST Handbook 44 are roughly equivalent to an R76 instrument when $e = 50$ lb.

During the 2005 NCWM Interim Meeting, the Committee agreed that the proposal has merit. However, the Committee made the proposal an information item in response to requests from jurisdictions for more time to examine data from test results using the proposed tolerances and to determine if there are devices that cannot comply, without the additional 5 d tolerance presently in Table 6.

Currently, only NEWMA is recommending the proposal move forward for a vote. The WWMA and CWMA recommend the proposal remain an information item until more data is gathered to determine whether or not it creates any problems regarding field equipment or how field officials apply the requirement. For more background information, refer to the Committee's 2005 Final Report.

320-6 T.N.4.5.1. Time Dependence; Class II, III, and IIII Non-automatic Weighing Instruments

Source: Southern Weights and Measures Association (SWMA)

Recommendation: Modify paragraph T.N.4.5.1. Time Dependence as follows:

T.N.4.5.1. Time Dependence; Class II, III, and IIII Non-automatic Weighing Instruments. - A non-automatic weighing instrument of Classes II, III, and IIII shall meet the following requirements at constant test conditions; during type evaluation, this test shall be conducted at 20 °C.:

- (a) When any load is kept on an instrument, the difference between the indication obtained immediately after placing the load and the indication observed during the following 30 minutes shall not exceed 0.5 e .

- (b) However, the difference between the indication obtained at 15 minutes and that at 30 minutes shall not exceed 0.2 e. If these conditions are not met, the difference between the indication obtained immediately after placing the load on the instrument and the indication observed during the following 4 hours shall not exceed the absolute value of the maximum permissible error at the load applied.
- (c) The deviation on returning to zero as soon as the indication has stabilized, after the removal of any load which has remained on the instrument for 30 minutes, shall not exceed 0.5 e.

For a multi-interval instrument, the deviation shall not exceed 0.5 e_1 (first weighing segment).

On a multiple range instrument, the deviation on returning to zero from Max_i (load in the applicable weighing range) shall not exceed 0.5 e_i (interval of the weighing segment). Furthermore, after returning to zero from any load greater than Max_1 (capacity of the first weighing range) and immediately after switching to the lowest weighing range, the indication near zero shall not vary by more than e_1 (interval of the first weighing range) during the following 5 minutes.

(Added 2005) **(Amended 200X)**

Discussion: The proposal is intended to further harmonize the test conditions in U.S. requirements for time dependence tests with procedures included in OIML requirements. OIML requires that factors such as temperature, which might contribute to errors in test results, be kept constant. Consequently, the SWMA proposes to modify paragraph T.N.4.5.1. to specify that a constant temperature of 20 °C must be maintained during laboratory test conditions for type evaluation. The Committee might consider a further modification of paragraph T.N.4.5.1. that is less restrictive than the proposal to include a range of temperatures representative of a typical laboratory environment.

320-7 T.N.4.6.(b) Apportionment Factors, Table T.N.4.6. Maximum Permissible Error (mpe)* for Load Cells During Type Evaluation, T.N.4.7. Creep Recovery for Load Cells During Type Evaluation, and Appendix D; Definitions of D_{min}

Source: National Type Evaluation Technical Committee (NTETC) Weighing Sector

Recommendation: Modify paragraph T.N.4.6.(b) and Table T.N.4.6. as follows:

T.N.4.6. Time Dependence (Creep) for Load Cells During Type Evaluation. – A load cell (force transducer) marked with an accuracy Class shall meet the following requirements at constant test conditions:

- (a) Permissible Variations of Readings.** - With a constant maximum load for the measuring range (D_{max}) between 90 % and 100 % of maximum capacity (E_{max}), applied to the load cell, the difference between the initial reading and any reading obtained during the next 30 minutes shall not exceed the absolute value of the maximum permissible error (mpe) for the applied load (see Table T.N.4.6.). The difference between the reading obtained at 20 minutes and the reading obtained at 30 minutes shall not exceed 0.15 times the absolute value of the mpe (see Table T.N.4.6.).
- (b) Apportionment Factors.** - The mpe for creep shall be determined from Table T.N.4.6. Maximum Permissible Error (mpe) * for Load Cells using the following apportionment factors (p_{LC}):

$p_{LC} = 0.7$ for load cells marked with S (single load cell applications), **~~and~~**
 $p_{LC} = 1.0$ for load cells marked with M (multiple load cell applications), **~~and~~**
 $p_{LC} = 0.5$ for Class III L load cells marked with S or M
(Amended 200X)

(Added 2005)

Table T.N.4.6. Maximum Permissible Error (mpe)* for Load Cells During Type Evaluation			
mpe in Load Cell Verifications Divisions (v) = p_{LC} x Basic Tolerance in v			
Class	p_{LC} x 0.5 v	p_{LC} x 1.0 v	p_{LC} x 1.5 v
I	0 - 50 000 v	50 001 v - 200 000 v	200 001 v +
II	0 - 5 000 v	5 001 v - 20 000 v	20 001 v +
III	0 - 500 v	501 v - 2 000 v	2 001 v +
III	0 - 50 v	51 v - 200 v	201 v +
III L	0 - 500 v	501 v - 1 000 v	(Add 0.5 v to the basic tolerance for each additional 500 v or fraction thereof up to a maximum load of 10 000 v)

v represents the load cell verification interval
 p_{LC} represents the apportionment factors applied to the basic tolerance
 $p_{LC} = 0.7$ for load cells marked with S (single load cell applications)
 $p_{LC} = 1.0$ for load cells marked with M (multiple load cell applications)
 $p_{LC} = 0.5$ for Class III L load cells marked with S or M
 * mpe = p_{LC} x Basic Tolerance in load cell verifications divisions (v)

(Table Added 2005) **(Amended 200X)**

Add new paragraph T.N.4.7. as follows:

T.N.4.7. Creep Recovery for Load Cells During Type Evaluation. – The difference between the initial reading of the minimum load of the measuring range (D_{min}) and the reading after returning to minimum load subsequent to the maximum load ($E_{D_{max}}$) having been applied for 30 minutes shall not exceed:

0.5 times the value of the load cell verification interval (0.5 v) for Class I, II, III, and III L load cells or,

1.5 times the value of the load cell verification interval (1.5 v) for Class III L load cells.
(Added 200X)

Add new definitions of D_{min} and E_{min} to Appendix D as follows:

D_{min} (minimum load of the measuring range). Smallest value of a quantity (mass) which is applied to a load cell during test or use. This value shall not be less than E_{min} . [2.20]
(Added 200X)

E_{min} (minimum dead load). Smallest value of a quantity (mass) which may be applied to a load cell during test or use. This value shall not be less than E_{min} . [2.20]
(Added 200X)

Discussion: In 2005 the NIST Handbook 44 Scales Code was modified to include requirements for time dependence tests and to adapt U.S. requirements and OIML test procedures. Creep recovery test procedures and the appropriate apportionment factor for Class III L load cells were inadvertently omitted from the proposal to modify NIST Handbook 44. This current proposal modifies the test notes to include the necessary procedures and to add corresponding terminology that applies to values read from the creep recovery test.

320-8 UR.1.6. Computing Scale Interfaced to a Cash Register

Source: Carryover Item 320-3. (This item originated from the Southern Weights and Measures Association (SWMA) and first appeared on the Committee's 2005 agenda.)

Recommendation: Add a new paragraph UR.1.6. to the Scales Code as follows:

UR.1.6. Computing Scale Interfaced to a Cash Register. – A computing scale may interface with a cash register provided all displayed and recorded indications agree:

- (a) the cash register only records (serves as printer) the information received from the scale,**
- (b) the computing scale has tare capability,**
- (c) the computing scale is not equipped with PLU capability,**
- (d) The electronic cash register does not have any input to the computing scale in the process of determining the total price of a weighed item.**

(Added 200X)

Discussion: This proposal is intended to add new device-specific code requirements to the Scales Code to address the proper interface of computing scales with electronic cash registers (ECRs) and to clarify how each component must display transaction information, function in taking tare, and operate with Price-Look-Up (PLU) capability. The current NIST Handbook 44 General Code provisions specifying that weighing and measuring equipment and associated devices shall not facilitate fraud are not sufficient to clarify how a computing scale interfaced with an ECR should operate.

The proposal was developed in response to reports of computing scales interfaced with ECRs, where the ECR accepts weighing results from the computing scale and uses the ECR's price look-up (PLU) feature to retrieve tare and unit price information and calculate the total price. In this instance a different unit price, tare, and total price may already be manually entered and displayed on the computing scale. What customers view on the computing scale as the net weight, unit price, and total price may not be what is actually used by the ECR to calculate the customer's charge. In this example, the NTEP CC for field devices found out of compliance did not list the interface as an approved application.

The proposal began as a new specification (rather than a user requirement) with the exact same wording as shown above. It was thought that the language should clarify that it is acceptable for the ECR and computing scale to communicate the total price, but not to the point where the input process involves the ECR calculating the total price. The Committee recommended that jurisdictions, if they have not already done so, establish clear examination procedures (e.g., enter a new price per pound at the ECR) so that officials also have field examination procedures to verify that an ECR and computing scale interface are in compliance.

The Committee heard numerous comments that the proposed specification would be too restrictive to new technology. Industry believed the proposal written as a specification might limit future technology used to interface equipment. Manufacturers indicated the proposed subparagraphs were too restrictive when a point-of-sale system (POS) reads UPC codes and recomputes prices for frequent shopper discounted prices. The Committee heard that, since type evaluation already verifies the requirements proposed in the new paragraphs, the Committee should consider an alternate proposal that only specifies "all indications must agree." The Committee believed the term "input" should be expanded to provide more detail to the field official about how the interface works. The Committee concluded that a requirement is needed to ensure equipment is properly interfaced as approved by NTEP and as intended by the manufacturer's design once it is in commercial use. Consequently, the Committee modified the proposal making it a user requirement with the recommendation that it be adopted by the NCWM.

During the 2005 NCWM Annual Meeting, the Committee heard that there are instances in which a computing scale may be inappropriately interfaced with an ECR to create a point-of-sale system contrary to the intended device application covered on the device's CC. Neither proposal addresses computing scales with multiple sales accumulation capability. The current definition of a POS may also require some modification to clarify the specific type of weighing element that is permitted as part of the POS assembly. The Committee believes this becomes a design issue rather than one involving the user; however, a user requirement might also be appropriate. The Committee changed the item status from "voting" to "information" and recommended SWMA rework the proposal as a specification that (1) provides more detail to the field official about how the cash register must function, (2) is readily available as a specification in NIST Handbook 44 to assist device manufacturers who are considering design modifications to a computing scale or cash register, and

(3) ensures there are no conflicts with requirements in corresponding paragraphs such as S.1.8.4. Recorded Representations, Point-of-Sale Systems.

The WWMA recommends withdrawing the item since there is sufficient language in General Code paragraphs G-S.2. Graduations, Indications, and Recorded Representation, G-S.5.2.2. Digital Indication and Representation, and G-UR.1.1. Suitability of Equipment to address the proper interface of a POS with an ECR. NEWMA indicated the item should be withdrawn because it needs further development. SWMA received limited comments on the proposal and decided to take no further position on the item.

For more background information, refer to the Committee's 2005 Final Report.

320-9 UR.2.6.1. Vehicle Scales; Approaches

Source: Central Weights and Measures Association (CWMA)

Recommendation: Modify paragraph UR.2.6.1. as follows:

***UR.2.6.1. Vehicle Scales.** - On the entrance and exit end or ends of a vehicle scale installed in any one location for a period of 6 months or more, there shall be a straight approach as follows:*

- (a) the width at least the width of the platform,*
- (b) the length at least one-half the length of the platform but not required to be more than 12 m (40 ft), and*
- (c) not less than 3 m (10 ft) of any approach adjacent to the platform shall be constructed of concrete or similar durable material to ensure that this portion remains smooth and level and in the same plane as the platform. However, grating of sufficient strength to withstand all loads equal to the concentrated load capacity of the scale may be installed in this portion. Any slope in the remaining portion of the approach shall ensure (1) ease of vehicle access, (2) ease for testing purposes, and (3) drainage away from the scale.*

[Nonretroactive as of 1976]

(Amended 1977, 1983, ~~and~~ 1993 and 200X)

Discussion: The CWMA proposal was developed to clarify that the wording in paragraph U.R.2.6.1. recognizes installations that have a combination entrance and exit. Space limitations at the installation site or the scale's design may dictate that the vehicle must be driven on and off the load receiving element from the same end of the scale. NEWMA does not support the proposal because it believes the current language can be interpreted to permit installations with an approach that is a combination entrance and exit.

320-10 UR.3.7. Minimum Load on a Vehicle Scale

Source: Southern Weights and Measures Association (SWMA)

Recommendation: Modify paragraph UR.3.7.(a) Minimum Load on a Vehicle Scale as follows:

UR.3.7. Minimum Load on a Vehicle Scale. - A vehicle scale shall not be used to weigh net loads smaller than:

- (a) 10 d when weighing scrap material for recycling and for refuse materials at landfills;
- (b) 50 d for all other weighing.

As used in this paragraph, scrap materials for recycling shall be limited to ferrous metals, paper (including cardboard), textiles, plastic, and glass.

(Amended 1988 ~~and~~ 1992 and 200X)

Discussion: SWMA believes the same 10 d minimum load requirement granted in 1992 for the weighing of certain scrap materials and recyclables should apply to refuse hauled to landfills. SWMA found that both types of material are redeemed or disposed of in small quantities and are awkward and sometimes unsafe (long, sharp, protruding edges) to handle and, thus, fall under the earlier rationale that allowed the 10 d minimum load. Because of the low value of this material, it is not profitable for centers to accept those materials nor does it make it feasible for them to purchase a suitable scale. SWMA notes that many municipal landfills accept those materials in quantities that are in violation of paragraph UR.3.7., but do so to prevent citizens from improperly disposing of materials. SWMA believes that expanding the 10 d minimum load requirement is sensible and environmentally responsible.

NEWMA supports an alternative proposal which would require a 20 d minimum load for all commodities weighed on a vehicle scale. NEWMA reports that some jurisdictions do not enforce the 50 d minimum load requirement at municipal landfills and other sites because of the low cost of the commodity. NEWMA suggested several points for consideration when there is a 10 d minimum load requirement. First, the price of the commodity should be a factor in deciding the minimum load limit. It is also inappropriate to have a 10 d minimum load requirement especially for large-capacity scales where rounding errors may contribute to uncertainties in the measurement.










320-11 List of International Symbols Noted as Acceptable

Source: Carryover Item 320-9. (This item originated from the Southern Weights and Measures Association (SWMA) and first appeared on the Committee's 2005 agenda.)

Recommendation: Add a new Appendix E as follows:

Appendix E

List of Acceptable Abbreviations/Symbols

Device Application	Term	Acceptable	Not Acceptable
The following symbols are intended for operator controls, indications, and features. When they are also intended for the customer (including customer-operated devices), they cannot be used without additional descriptions, directions, or marks displayed or marked on the device.			
<u>Operational Controls, Indications, Features:</u>	<u>zero key or center of zero indicator</u>		<u>"z" alone is not acceptable unless term is defined on device</u>
	<u>Off (Power)</u>		
	<u>On (Power)</u>		
	<u>On/Off (Power)</u>		
	<u>Print</u>		
	<u>Weighing</u>		
	<u>Scale n (n = 1, 2, ...)</u>		
	<u>Range n (n = 1, 2, ...)</u>		
	<u>High resolution</u>		

Device Application	Term	Acceptable	Not Acceptable
The following symbols are intended for operator controls, indications, and features. When they are also intended for the customer (including customer-operated devices), they cannot be used without additional descriptions, directions, or marks displayed or marked on the device.			
<u>Operational Controls, Indications, Features:</u>	<u>enter key</u>		
	<u>tare enter key</u>		
	<u>tare clear key</u>		
	<u>tare enter/tare clear</u>		
	<u>verify tare</u>		
	<u>Not for direct sales to the public</u>		
	<u>Combined zero/tare – See S.2.1.6. for additional information</u>		
	<u>Taring</u>		
	<u>Mass/Weight</u>		
	<u>Money</u>		
	<u>Price Per weight unit</u>		
	<u>Piece count</u>		
	<u>Counter</u>		
	<u>Read Counter</u>		
	<u>Print certificate</u>		
	<u>Information</u>		

(Table Added 200X)

Discussion: The proposed list of symbols introduces the U.S. weights and measures official to a set of international symbols for use in marking operator controls, indications, and device features. Recognition and use of these symbols are consistent with efforts to harmonize U.S. and international device requirements.

Currently, the list of symbols is part of NCWM Publication 14 “Technical Policy, Checklists, and Test Procedures” for Weighing Devices. NTEP uses international symbols whenever possible. Style differences, such as variations in the shape of arrows, are acceptable.

The Committee heard various recommendations for making the symbols readily accessible. The recommendations ranged from posting the list on a weights and measures website to placing the list in NIST Handbook 44 as an appendix.

The Committee agreed with the need to familiarize U.S. officials with international symbols and recommended the proposed list of acceptable new symbols be a new Appendix E in NIST Handbook 44. During the 2005 NCWM Annual Meeting, the Committee agreed that unless the table references a specific code, then the table applies to all types of devices. The Committee believes that if the table is to be used as an enforcement tool, then only symbols in the proposed list would be considered acceptable. The Committee preferred an all-inclusive list of acceptable symbols. If the table is intended to be all-inclusive, other acceptable symbols currently in use for all device types, such as the dollar sign (\$) on retail motor-fuel dispensers and taxi meters, must be added to the list. The Committee changed the status of the item from voting to an information item to allow time to develop language that will link the table to specific codes and to fully assess whether or not the table should be all-inclusive.

At their fall 2005 meetings, the regional weights and measures associations differed in their positions. The WWMA recommends withdrawing the proposal since the owner's manual or NCWM Publication 14 can be referenced for symbols and other markings and any device that holds a CC must have approved markings. The CWMA recommends listing the symbols in NIST Handbook 44. NEWMA suggests an alternate title "List of Acceptable Commonly Used Abbreviations/Symbols."

For more background information, refer to the Committee's 2005 Final Report.

321 BELT-CONVEYOR SCALE SYSTEMS

321-1 N.1.1. Official Test, N.4. As-found Inspection and Tests, and UR.4.1. As-found Inspection and Tests

Source: Western Weights and Measures Association (WWMA)

Recommendation: Modify paragraph N.1.1. as follows:

N.1.1. Official Test. - ~~A complete official test of a belt-conveyor scale system performed by the official with statutory authority shall be a~~ include N.3.1. Zero Load Test, N.3.2. Materials Test, and if applicable, N.3.3. Simulated Load Tests.
(Amended 200X)

Add new paragraphs N.4. and UR.4.1. as follows:

N.4. As-found Inspection and Test. – The official with statutory authority may inspect the belt-conveyor scale system as-found in normal operation without notice prior to receiving the written notification provided the owner or his agent that the system is in compliance and ready for material testing as required in UR.4. Compliance. During the as-found inspection, the official may conduct zero-load and simulated load tests. The official with statutory authority will require that an official material test be conducted within a time frame established by the official¹.
(Added 200X)

¹The official material test may be scheduled sooner than the normal frequency of testing based upon areas of non-compliance and the condition of the installation during the as-found inspection and tests.

UR.4.1. As-found Inspection and Tests. As a result of the tests and inspections performed according to paragraph N.4. As-found Inspection and Tests, the scale owner and/or his agent shall correct any deficiencies identified by the official prior to the official material test. They may also continue performing scheduled or routine maintenance (e.g., cleaning, and checking alignment, pulleys, idlers, etc.) prior to the official material tests provided these activities are documented as part of the operational procedures

for the installation. The scale owner and/or his agent shall notify the official with statutory authority when the areas of non-compliance have been corrected and if repairs or adjustments are required or performed due to conveyor or scale equipment damage or failure.

(Added 200X)

Discussion: Most commercial weighing and measuring devices are subject to unannounced inspections by weights and measures officials. However, the nature of the inspection and test described in paragraph N.1.1. usually requires advance scheduling to arrange the logistics for testing the reference scale(s) and, if necessary, procurement of vehicles or railcars to transport the pre-weighed or post-weighed material. This practice provided many owner/users of belt-conveyor scales with an opportunity to inspect, clean, and prepare the systems in advance of the test. The owner/user of the scale is required to notify the official with statutory authority that the scale is ready for test in accordance with paragraph UR.4. Compliance. As a result, the official cannot verify compliance with NIST Handbook 44 General Code paragraph G-UR.4.1. Maintenance of Equipment since the as-found condition and performance of the scale does not represent its as-used condition and performance.

The proposal encourages officials to perform as-found inspections and zero-load and simulated load tests to assess compliance with G-UR.4.1. Maintenance of Equipment rather than relying solely on the inspection conducted during the official material tests. The proposal further encourages scale owners and users to perform and document routine inspections and maintenance of the belt-conveyor scale system if they know they are subject to unannounced inspections. The WWMA modified the proposal before recommending it for consideration by the Committee. The SWMA asked for additional input from parties affected by the proposal before it takes a position.

321-2 UR.2.2.(n) Belt Alignment

Source: Southern Weights and Measures Association (SWMA)

Recommendation: Modify paragraph UR.2.2.(n) as follows:

UR.2.2. Conveyor Installation

(n) Belt Alignment. – The belt shall be centered on the idlers in the weighing area and shall track in practically the same position whether empty or loaded. The belt shall not extend beyond the edge of the idler roller in any area of the conveyor.

(Amended 1998 **and 200X**)

Discussion: The WWMA considered the proposed changes to paragraph UR.2.2. to provide needed guidance on belt tracking before, during, or after a material tests. Ideally, the belt should be in the same location at full load or empty conditions. If the belt location or belt tension is not constant, scale accuracy is affected. Consequently, the WWMA agreed to recommend a proposal to modify paragraph UR.2.2. to make the scale user/owner aware that the belt position must be monitored and maintained. The WWMA suggested the proposal as a developing item.

The CWMA supports the proposal but recommends removing any ambiguity by deleting the word “practically” from the proposed text. The SWMA supports the proposal being a voting item on the Committee’s 2006 agenda.

330 LIQUID-MEASURING DEVICES

330-1 S.1.2. Units

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Modify paragraph S.1.2. Units as follows:

S.1.2. Units. - A liquid-measuring device shall indicate, and record if the device is equipped to record, its deliveries in liters, gallons, quarts, pints, **fluid ounces**, or binary-submultiples or decimal subdivisions of the liter or gallon.

(Amended 1987, 1994, **and 200X**)

Background/Discussion: NTEP issued a CC for a liquid-measuring device that displays its deliveries in fluid ounces. The device currently in use always makes a delivery of 4 fl oz. A jurisdiction would not approve the use of the devices stating that those units of measurement are not recognized in paragraph S.1.2. in the LMD code. However, because paragraph S.1.2. allows binary submultiples of the liter or gallon, an indication of 1/32 gallon would be acceptable.

At the spring 2005 NTEP Laboratory Meeting, the laboratories agreed that consumers would understand 4 fl oz better than 1/32 gallon and asked the Measuring Sector to review the proposal as shown above.

At its October 2005 Meeting, the NTETC Measuring Sector reviewed the proposal and agreed to forward it to the Committee for consideration. At its October 2005 meeting, the SWMA supported the Measuring Sector's recommendation and recommended that the item move forward to the Committee.

330-2 S.1.2.3. Value of the Smallest Unit

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Modify NIST Handbook 44, paragraph S.1.2.3. as follows:

S.1.2.3. Value of Smallest Unit. - The value of the smallest unit of indicated delivery, and recorded delivery if the device is equipped to record, shall not exceed the equivalent of:

- (a) 0.5 L (~~1-pt~~ 0.1 gal) on ~~retail~~ devices with a maximum rated flow rate of 750 L/min (200 gal/min) or less.
- (b) 5 L (1 gal) on ~~wholesale~~ devices with a maximum rated flow of more than 750 L/min (200 gal/min).

This requirement does not apply to manually operated devices equipped with stops or stroke-limiting means.
(Amended 1983, ~~and~~ 1986, and 200X)

Background/Discussion: In 2004 the definition of a "retail device" in NIST Handbook 44 was modified to include all devices used to measure product for the purpose of sale to the end user. At that time, the Committee believed all affected parties were aware of the proposal and there was no opposition to the change. However, after the 2005 edition of the handbook was published and distributed, WMD received a comment from a weights and measures jurisdiction that routinely tests large meters used to deliver fuel to fishing fleets and other large ocean going boats. The jurisdiction stated that the average delivery is approximately 300 000 gallons and may be as much as 1 million gallons. Prior to the revision of the definition of "retail," the value of the smallest unit of the indicated delivery for these devices was permitted to be 1 gallon. Most of the devices have mechanical registers which make it impractical to have a smallest unit of 0.1 at the high flow rates used for such large deliveries. Because the fuel is being delivered to the end user, the jurisdiction believes this is a retail delivery. However, with the revisions to the definition of retail device, NIST Handbook 44 now requires a smallest unit of delivery of not more than 0.5 L (1 pint) for these devices.

At its October 2005 meeting, the NTETC Measuring Sector reviewed the proposal and agreed to forward the proposal to the Committee for consideration. At its October 2005 meeting, the SWMA agreed with the Measuring Sector's recommendation and recommended that the item move forward to the Committee.

330-3 Table S.2.2. Categories of Device and Methods of Sealing

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Modify Table S.2.2. as follows:

Table S.2.2. Categories of Device and Methods of Sealing	
Category of Device	Method of Sealing
Category 1: No remote configuration capability.	Seal by physical seal or 2 event counters: 1 for calibration parameters and 1 for configuration parameters.
<p>[Category 2 applies only to devices manufactured prior to January 1, 2005. Devices with remote configuration capability manufactured after that date must meet the sealing requirements outlined in Category 3. Devices without remote configuration capability manufactured after that date must meet the minimum criteria outlined in Category 1.]</p> <p>Category 2: Remote configuration capability, but access is controlled by physical hardware.</p> <p>The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.</p>	<p>[The hardware enabling access for remote communication must be on-site. The hardware must be sealed using a physical seal or an event counter for calibration parameters and an event counter for configuration parameters. The event counters may be located either at the individual measuring device or at the system controller; however, an adequate number of counters must be provided to monitor the calibration and configuration parameters of the individual devices at a location. If the counters are located in the system controller rather than at the individual device, means must be provided to generate a hard copy of the information through an on-site device.]*</p> <p>[*Nonretroactive as of January 1, 1996]</p>
<p>Category 3: Remote configuration capability access may be unlimited or controlled through a software switch (e.g., password).</p> <p>[Nonretroactive as of January 1, 1995]</p> <p>The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.</p> <p>[Nonretroactive as of January 1, 2001]</p> <p>Nonretroactive as of January 1, 2005, all devices with remote configuration capability must comply with the sealing requirements of Category 3.</p>	<p>An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. A printed copy of the information must be available through the device or through another on-site device. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)</p>

[Nonretroactive as of January 1, 1995]

(Table Added 1993) (Amended 1995, 1998, and 1999, and 200X)

Background/Discussion: At its 1998 Annual Meeting, the NCWM adopted a proposal to eliminate Category 2 as an option for devices that fall under the sealing requirements for Liquid-Measuring Devices Code and the Mass Flow Meters Code. Effective January 1, 2005, all devices falling under these two codes must be designed as a Category 1 device or, if equipped with remote configuration capability, must be a Category 3 device.

At its October 2005 meeting, the NTETC Measuring Sector discussed NIST Handbook 44 codes for liquid-measuring devices that do not have specific provisions for electronic sealing (i.e., audit trails) in the code, such as the Vehicle-tank Meters Code or the LPG and Anhydrous Ammonia Liquid-Measuring Devices Code. At the meeting, manufacturers of these devices stated that they have designed metering systems with electronic sealing capability with remote configuration capability. They are currently seeking an NTEP CC for these systems. Currently the specific NIST Handbook 44 code for these devices does not address electronic sealing, but it is recognized in the General Code and under the provisions of G-A.3. Special and Unclassified Equipment. Accordingly NTEP has made an “ad hoc” decision to apply the criteria in the LMD code to these devices; however, the manufacturers would prefer that specific language similar to that in the Liquid-Measuring Devices (LMD) Code. During the discussion, the Sector concluded that some of these new applications and other applications currently in use in fact would have been classified as the former device Category 2 device. The Sector agreed that the decision to remove Category 2 from the LMD Code and the Mass-flow

Meters Code should be reversed and that provisions for electronic sealing should be added to all appropriate liquid-measuring devices code as proposed in items 330-3, 331-2, 332-1, 334-1, 335-1, and 338-1 and agreed to forward that proposal to the Committee for consideration.

330-4 S.3.1. Diversion of Measured Liquid

Source: Central Weights and Measures Association (CWMA)

Recommendation: Amend Paragraph S.3.1. as follows:

S.3. Discharge Lines and Valves.

S.3.1. Diversion of Measured Liquid. - No means shall be provided by which any measured liquid can be diverted from the measuring chamber of the meter or its discharge line. Two or more delivery outlets may be installed only if automatic means are provided to ensure that:

- (a) liquid can flow from only one outlet at a time, and
- (b) the direction of flow for which the mechanism may be set at any time is clearly and conspicuously indicated.

~~An manually controlled~~ outlet that may be opened for purging or draining the measuring system or for recirculating, ~~if recirculation is required in order to maintain the product in a deliverable state, suspension shall be permitted only when the system is measuring food products or agri-chemicals.~~ Effective means shall be provided to prevent passage of liquid through any such outlet during normal operation of the measuring system and to inhibit meter indications (or advancement of indications) and recorded representations while the outlet is in operation.

(Amended 1991, 1995, ~~and~~ 1996 and 200X)

Background/Discussion: The CWMA noted that the requirements in paragraph S.3.1. of Section 3.30 Liquid Measuring Devices and paragraph S.4.1. Diversion of Measured Product of Section 3.37 Mass Flow Meters of NIST Handbook 44 (2005) are not consistent with each other. Paragraph S.3.1. bans manual valves for re-circulating product or purging or draining the measuring system except for foods and agri-chemicals. Paragraph S.4.1. allows manual valves but appears to ban automatic valves by omission, and makes no distinction for types of products measured as long as the system meets the specified requirements.

Cold weather and physical characteristics make recirculation necessary for a number of products not currently allowed in paragraph S.3.1. of Section 3.30. (#6 Fuel oil and B100 Biodiesel, for example). Although liquid-measuring devices exist which have NTEP CCs for these high viscosity products, the current wording of the handbook restricts vendors of these products to using mass flow technology if they wish to recirculate their product in order to keep it in a deliverable state. This appears to be the unintended result of the fact that the two codes were written at different times with different input from industry lobbies. The CWMA recommends that retailers of these products not be restricted to using only mass flow meters for commercial measurements if other suitable technologies are available. Likewise, both manual and automatic valves are suitable for recirculating product in discharge lines of these devices, and the use of either type should be allowed.

At the CWMA 2005 Interim Meeting, it was noted that adopting this proposal will create a logical and consistent standard of enforcement for mass flow meters and liquid-measuring devices, which are used for identical applications and products, thus ending an unintentional bias in favor of one technology over the other.

By stating the uniform guidelines for when it is acceptable to allow purge lines and recirculation lines (i.e., the necessity for such lines is to keep the product in a deliverable state), this proposal would eliminate the need for industry to petition the NCWM for each product which requires such special handling. The CWMA agreed to forward the proposal with the recommendation that it be a voting item on the Committee's 2006 agenda.

330-5 Table T.2. Accuracy Classes for Liquid Measuring Devices Covered in NIST Handbook 44 Section 3.30

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Modify Table T.2. as follows:

Table T.2. Accuracy Classes for Liquid Measuring Devices Covered in NIST Handbook 44 Section 3.30				
Accuracy Class	Application	Acceptance Tolerance	Maintenance Tolerance	Special Test Tolerance¹
0.3	Petroleum products delivered from large capacity (flow rates over 115 L/min (30 gpm))** devices including motor fuel devices, heated products at or greater than 50° C asphalt at or below temperatures 50° C, all other liquids not shown where the typical delivery is over 200 L (50 gal)	0.2 %	0.3 %	0.5 %
0.3A	Asphalt at temperatures greater than 50° C	0.3 %	0.3 %	0.5 %
0.5*	Petroleum products delivered from small capacity (at 4 L/min (1 gpm) through 115 L/min (30 gpm))** motor-fuel devices, agri-chemical liquids, and all other applications not shown where the typical delivery is # 200 L (50 gal)	0.3 %	0.5 %	0.5 %
1.1	Petroleum products and other normal liquids from devices with flow rates** less than 1 gpm and devices designed to deliver less than 1 gallon	0.75 %	1.0 %	1.25 %
<p>*For 5-gallon and 10-gallon test drafts, the tolerances specified for Accuracy Class 0.5 in the table above do not apply. For these test drafts, the maintenance tolerances on normal and special tests (<u>except for retail motor-fuel dispensers</u>) for 5-gallon and 10-gallon test drafts are 6 cubic inches and 11 cubic inches, respectively. Acceptance tolerances on normal and special tests (<u>except for retail motor-fuel dispensers</u>) are 3 cubic inches and 5.5 cubic inches. ¹ <u>Special Test Tolerances are not applicable to retail motor-fuel dispensers.</u></p> <p>** Flow rate refers to designed or marked maximum flow rate.</p>				

(Added 2002)(**Amended 200X**)

Background/Discussion: Prior to the addition of Table T.2. “Accuracy Classes for Liquid Measuring Devices Covered in NIST Handbook 44 Section 3.30” in the LMD Code of NIST Handbook 44 in 2002, the applicable tolerances in T.2.1. Tolerance Values for “retail devices” of any flow rate, including RMFDs, were the same for normal and special tests. Special test tolerances were only applicable to “wholesale devices” measuring liquids other than agri-chemicals and asphalt.

At its October 2005 meeting, the NTETC Measuring Sector reviewed a proposal that would remove the special test tolerance for RMFDs and wholesale meters measuring agri-chemicals and asphalt. The Sector agreed that some devices measuring agri-chemicals and asphalt should have a special test tolerance. The current definition of “retail” in Handbook 44 now applies to devices that, prior to 2004 when the definition of “retail” was changed, would have met the definition for a wholesale device with regard to flow rate. When the wholesale devices measuring agri-chemicals and asphalt were classified as “wholesale,” they were permitted to have a special test tolerance. Those same devices may now meet the criteria to be classified as “retail”; however they should still be allowed to have a special test tolerance. The Sector agreed to limit the proposal to only RMFDs and to forward the proposal shown above to the Committee for consideration. At its October 2005 Annual Meeting, the SWMA agreed with the Measuring Sector that special test tolerances should not be applicable to RMFDs of any flow rate.

331 VEHICLE-TANK METERS

331-1 S.1.1.3. Value of Smallest Unit

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Modify Paragraph S.1.1.3. as follows:

S.1.1.3. Value of Smallest Unit. - The value of the smallest unit of indicated delivery, and recorded delivery if the meter is equipped to record, shall not exceed the equivalent of:

- (a) 0.5 L (0.1 gal) or 0.5 kg (1 lb) on milk-metering systems,
- (b) 0.5 L (0.1 gal) on meters with a rated maximum flow rate of ~~500~~ 750 L/min (~~100~~ 200 gal/min) or less used for ~~retail~~ deliveries of liquid fuel, or
(Amended 200X)
- (c) 5 L (1 gal) on meters with a rated maximum flow of 575 L/min (150 gal/min) or more used for jet fuel aviation refueling systems,
(Added 200X)
- (ed) 5 L (1 gal) on other meters.

Discussion/Background: Paragraph S.1.1.3. in the VTM Code requires the smallest unit of indicated delivery to be not greater than 0.5 L (0.1 gal) for deliveries on meters with a rated maximum flow rate of 500 L/min (100 gal/min) or less used for retail deliveries of liquid fuel and 5 L (1 gal) for all other meters (except milk-metering systems). VTMs with rated maximum flow rates up to approximately 150 gallons per minute are being introduced into the marketplace for use in making deliveries of approximately the same amount as those previously made with devices that had maximum flow rates of 100 gallons per minute or less. The amount of the increase in flow rate and the amount of product being delivered do not warrant a tenfold increase in the required value of the smallest unit of measurement.

At its 2005 meeting, the NTETC Measuring Sector reviewed a proposal to increase the rated maximum flow rate criteria in S.1.1.3. from 100 gallons per minute to 200 gallons per minute. Some manufacturers of aviation refueling systems suggested that these systems need a separate criterion due to the unique nature of their application. The Sector agreed with the aviation refueler manufacturers and agreed to forward the proposal to the Committee for consideration. At its October 2005 meeting, the SWMA supported the Measuring Sector's proposal and recommended the item move forward to the Committee.

331-2 S.2.2. Provision for Sealing and Table S.2.2. Categories of Device and Methods of Sealing

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Modify paragraph S.2.2., delete S.2.2.1., and add new Table S.2.2. Categories of Device and Methods of Sealing as follows:

S.2.2. Provision for Sealing. – ~~Except on devices for metering milk, a~~ Adequate provision shall be made for applying security seals in such a manner that no an approved means of security (e.g., data change audit trail) or for physically applying a security seal in such a manner that requires the security seal to be broken before an adjustment may be made of:

- (a) any measurement element, indicating element, and
- (b) any adjustable element for controlling delivery rate, when such rate tends to affect the accuracy of deliveries.

~~S.2.2.1. Milk Metering Systems. Adequate provision shall be made for applying security seals to the adjustment mechanism and the register. The adjusting mechanism shall be readily accessible for purposes of affixing a security seal.~~

When applicable, the adjusting mechanism shall be readily accessible for purposes of affixing a security seal.

Audit trails shall use the format set forth in Table S.2.2.

[Nonretroactive as of January 1, 200X]

<u>Table S.2.2. Categories of Device and Methods of Sealing</u>	
<u>Category of Device</u>	<u>Method of Sealing</u>
<u>Category 1: No remote configuration capability.</u>	<u>Seal by physical seal or 2 event counters: 1 for calibration parameters and 1 for configuration parameters.</u>
<u>Category 2: Remote configuration capability, but access is controlled by physical hardware.</u> <u>The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.</u>	<u>[The hardware enabling access for remote communication must be on-site. The hardware must be sealed using a physical seal or an event counter for calibration parameters and an event counter for configuration parameters. The event counters may be located either at the individual measuring device or at the system controller; however, an adequate number of counters must be provided to monitor the calibration and configuration parameters of the individual devices at a location. If the counters are located in the system controller rather than at the individual device, means must be provided to generate a hard copy of the information through an on-site device.]</u>
<u>Category 3: Remote configuration capability access may be unlimited or controlled through a software switch (e.g., password).</u> <u>The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.</u>	<u>An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. A printed copy of the information must be available through the device or through another on-site device. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)</u>

[Nonretroactive as of January 1, 200X]

(Table Added 200X)

Background/Discussion: At its October 2005 meeting, the NTETC Measuring Sector discussed Handbook 44 codes for liquid-measuring devices that do not have specific provisions for electronic sealing (i.e., audit trails) in the code, such as the VTM Code or the LPG and Anhydrous Ammonia Metering-Devices Code. At the meeting, manufacturers of these devices stated that they have designed metering systems with electronic sealing capability with remote configuration capability. They are currently seeking an NTEP CC for these systems. Currently the specific NIST Handbook 44 code for these devices does not address electronic sealing, but it is recognized in the General Code and under the provisions of G-A.3. Special and Unclassified Equipment. Accordingly, NTEP has made an “*ad hoc*” decision to apply the criteria in the LMD Code to these devices. The manufacturers would prefer specific language similar to that in the LMD Code be applied to the VTM and the LPG and Anhydrous Ammonia Metering-Devices Codes. During the discussion, the Sector concluded that some of these new applications and other applications currently in use would have been classified as the former Category 2 device. The Sector agreed that the decision to remove Category 2 from the LMD Code and the MFM

Code should be reversed and that provisions for electronic sealing should be added to all appropriate liquid-measuring devices codes as proposed in S&T Items 330-3, 331-2, 332-1, 334-1, 335-1, and 338-1. The Sector agreed to forward that proposal to the Committee for consideration.

331-3 Temperature Compensation

Source: Carryover Item 331-1 (This item originated from the Western Weights and Measures Association (WWMA) and first appeared on the Committee's 2000 agenda.)

Recommendation: Modify Section 3.31. Vehicle-Tank Meters (VTM) Code by adding the following new paragraphs to recognize temperature compensation as follows:

S.2.4. Automatic Temperature Compensation for Refined Petroleum Products.

S.2.4.1. Automatic Temperature Compensation for Refined Petroleum Products. - A device may be equipped with an automatic means for adjusting the indication and registration of the measured volume of product to the volume at 15 °C (60 °F), where not prohibited by State Law.

S.2.4.2. Provision for Deactivating. - On a device equipped with an automatic temperature-compensating mechanism that will indicate or record only in terms of liters (gallons) compensated to 15 °C (60 °F), provision shall be made for deactivating the automatic temperature-compensating mechanism so that the meter can indicate and record, if it is equipped to record, in terms of the uncompensated volume.

S.2.4.3. Gross and Net Indications - A device equipped with automatic temperature compensation shall indicate and record, if equipped to record, both the gross (uncompensated) and net (compensated) volume for testing purposes. If both values cannot be displayed or recorded for the same test draft, means shall be provided to select either the gross or net indication for each test draft.

S.2.4.4. Provision for Sealing Automatic Temperature-Compensating Systems. - Adequate provision shall be made for an approved means of security (e.g., data change audit trail) or physically applying security seals in such a manner that an automatic temperature-compensating system cannot be disconnected and that no adjustment may be made to the system.

S.2.4.5. Temperature Determination with Automatic Temperature Compensation. - For test purposes, means shall be provided (e.g., thermometer well) to determine the temperature of the liquid either:

(a) in the liquid chamber of the meter, or

(b) immediately adjacent to the meter in the meter inlet or discharge line.

(Added 200X)

S.5.6. Temperature Compensation for Refined Petroleum Products. - If a device is equipped with an automatic temperature compensator, the primary indicating elements, recording elements, and recording representation shall be clearly and conspicuously marked to show that the volume delivered has been adjusted to the volume at 15 °C (60 °F).

(Added 200X)

N.4.1.3. Automatic Temperature-Compensating Systems for Refined Petroleum Products. - On devices equipped with automatic temperature-compensating systems, normal tests shall be conducted:

(a) by comparing the compensated volume indicated or recorded to the actual delivered volume corrected to 15 °C (60 °F); and

(b) with the temperature-compensating system deactivated, comparing the uncompensated volume indicated or recorded to the actual delivered volume.

The first test shall be performed with the automatic temperature-compensating system operating in the "as-found" condition. On devices that indicate or record both the compensated and uncompensated volume for each delivery, the tests in (a) and (b) may be performed as a single test.
(Added 200X)

N.5. Temperature Correction for Refined Petroleum Products. - Corrections shall be made for any changes in volume resulting from the differences in liquid temperatures between the time of passage through the meter and time of volumetric determination in the prover. When adjustments are necessary, appropriate petroleum measurement tables should be used.
(Added 200X)

T.2.1. Automatic Temperature-Compensating Systems. - The difference between the meter error (expressed as a percentage) for results determined with and without the automatic temperature-compensating system activated shall not exceed:

(a) 0.4 % for mechanical automatic temperature-compensating systems; and

(b) 0.2 % for electronic automatic temperature-compensating systems.

The delivered quantities for each test shall be approximately the same size. The results of each test shall be within the applicable acceptance or maintenance tolerance.
(Added 200X)

UR.2.5. Temperature Compensation for Refined Petroleum Products.

UR.2.5.1. Automatic.

UR.2.5.1.1. When to be Used. - In a State that does not prohibit, by law or regulation, the sale of temperature-compensated product a device equipped with an operable automatic temperature compensator shall be connected, operable, and in use at all times. An electronic or mechanical automatic temperature-compensating system may not be removed, nor may a compensated device be replaced with an uncompensated device, without the written approval of the responsible weights and measures jurisdiction.

[Note: This requirement does not specify the method of sale for product measured through a meter.]

UR.2.5.1.2. Invoices. - An invoice based on a reading of a device that is equipped with an automatic temperature compensator shall show that the volume delivered has been adjusted to the volume at 15 °C (60 °F).

(Added 200X)

Discussion/Background: When this item was originally submitted, several officials reportedly were confused about the specific applications of a meter covered by an NTEP CC that included the temperature-compensation feature. The WDMA acknowledged some jurisdictions permit temperature compensated deliveries in applications that are not addressed by NIST Handbook 44. Some states do not allow the use of automatic temperature compensation for the delivery of products using a VTM. At the 2002, 2003, and 2004 NCWM Annual Meetings, this proposal did not achieve a majority vote to pass or fail and was, therefore, returned to the Committee for further consideration.

At the 2005 NCWM Interim Meeting, the Committee participated in a combined open hearing with the NCWM L&R Committee for discussion of this item and L&R Item 232-1 Temperature Compensation for Petroleum Products. A special forum was also held on the first day of the Interim Meeting to discuss temperature compensation issues. However, the Committee was informed that the L&R Committee kept its Item 232-1 as a developing issue. The L&R Committee considered modifying Item 232-1 to separately address the method of sale for other meter types. However, the L&R Committee decided not to split the item and instead modified Item 232-1 to allow temperature compensation for the sale of petroleum products, other than LPG and petroleum products sold through retail motor-fuel devices, and

changed the status of the item to a “Developing” issue. At the forum and the open hearings, the Committee received little or no new information on this item and considered withdrawing it from its agenda. However, because the L&R Committee continues to have a related item on its agenda, the Committee agreed to leave item 331-3 on its agenda as an information item.

During the 2005 NCWM Annual Meeting a manufacturer stated that the number of requests for retail motor-fuel dispensers with temperature compensation capability is increasing. The Committee agreed to maintain this item on its agenda until the L&R Item 232-1 is further developed.

At its September 2005 Interim Meeting, the CWMA agreed on the technical merit of the proposal and agreed that requirements are needed in NIST Handbook 44; however, the CWMA also agreed this is also a “method of sale” issue and the proposal should be retained as an information item until an accompanying method of sale requirement is added to Handbook 130.

At its September 2005 meeting, the WWMA reaffirmed its strong support of this proposal and recommended this item go forward for adoption by the NCWM.

At its October 2005 Meeting, NEWMA recommended withdrawing this item. NEWMA feels there is not enough support for this item and that, if it went for a vote again in July, it would still not pass.

For additional background on this item, see the Committee’s 2000 through 2005 Final Reports.

332 LIQUEFIED PETROLEUM GAS AND ANHYDROUS AMMONIA LIQUID-MEASURING DEVICES

332-1 S.2.2. Provision for Sealing and Table S.2.2. Categories of Device and Methods of Sealing

Recommendation: Modify paragraph S.2.2. and add new Table S.2.2. as follows:

S.2.2. Provision for Sealing. - Adequate provision shall be made for ~~applying security seals in such a manner that no~~ an approved means of security (e.g., data change audit trail) or for physically applying a security seal in such a manner that requires the security seal to be broken before an adjustment may be made of:

- (a) any measurement element, and
- (b) any adjustable element for controlling delivery rate, when such rate tends to affect the accuracy of deliveries.

When applicable, the adjusting mechanism shall be readily accessible for purposes of affixing a security seal.

Audit trails shall use the format set forth in Table S.2.2.

[Nonretroactive as of January 1, 200X]

(Amended 200X)

<u>Table S.2.2. Categories of Device and Methods of Sealing</u>	
<u>Category of Device</u>	<u>Method of Sealing</u>
<u>Category 1: No remote configuration capability.</u>	<u>Seal by physical seal or 2 event counters: 1 for calibration parameters and 1 for configuration parameters.</u>
<u>Category 2: Remote configuration capability, but access is controlled by physical hardware.</u> <u>The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.</u>	<u>[The hardware enabling access for remote communication must be on-site. The hardware must be sealed using a physical seal or an event counter for calibration parameters and an event counter for configuration parameters. The event counters may be located either at the individual measuring device or at the system controller; however, an adequate number of counters must be provided to monitor the calibration and configuration parameters of the individual devices at a location. If the counters are located in the system controller rather than at the individual device, means must be provided to generate a hard copy of the information through an on-site device.]</u>
<u>Category 3: Remote configuration capability access may be unlimited or controlled through a software switch (e.g., password).</u> <u>The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.</u>	<u>An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. A printed copy of the information must be available through the device or through another on-site device. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)</u>
<u>[Nonretroactive as of January 1, 200X]</u> <u>(Table Added 200X)</u>	

Background/Discussion: At its October 2005 meeting, the NTETC Measuring Sector discussed NIST Handbook 44 codes for liquid-measuring devices that do not have specific provisions for electronic sealing (i.e., audit trails), such as the VTM Code or the LPG and Anhydrous Ammonia Metering-Devices Code. At the meeting, manufacturers of these devices stated that they have designed metering systems with electronic sealing capability with remote configuration capability. They are currently seeking an NTEP CC for these systems. Currently, the specific NIST Handbook 44 code for these devices does not address electronic sealing, but it is recognized in the General Code and under the provisions of G-A.3. Special and Unclassified Equipment. Accordingly NTEP has made an “*ad hoc*” decision to apply the criteria in the LMD Code to these devices. The manufacturers would prefer that specific language similar to that in the LMD Code be applied to the VTM and the LPG and Anhydrous Ammonia Metering-Devices Code. During the discussion, the Sector concluded that some of these new applications and other applications currently in use would have been classified as the former Category 2 device. The Sector agreed that the decision to remove Category 2 from the LMD Code and the MFM Code should be reversed and that provisions for electronic sealing should be added to all appropriate liquid-measuring devices codes as proposed in S&T Items 330-3, 331-2, 332-1, 334-1, 335-1, and 338-1. The Sector agreed to forward that proposal to the Committee for consideration.

332-2 S.4.3. Location of Marking Information; Retail Motor-Fuel Dispensers

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Add a new paragraph S.4.3. and renumber subsequent paragraphs as follows:

S.4.3. Location of Marking Information; Retail Motor-Fuel Dispensers. - The required marking information in the General Code, Paragraph G-S.1. Identification shall appear as follows:

- (a) within 60 cm (24 in) to 150 cm (60 in) from the base of the dispenser;
- (b) either internally and/or externally provided the information is permanent and easily read; and
- (c) on a portion of the device that cannot be readily removed or interchanged (i.e., not on a service access panel).

Note: The use of a dispenser key or tool to access internal marking information is permitted for Retail Liquid-Measuring Devices.

[Nonretroactive as of January 1, 200X]

(Added 200X)

S.4.34. Temperature Compensation. - If a device is equipped with an automatic temperature compensator, the primary indicating elements, recording elements, and recorded representation shall be clearly and conspicuously marked to show that the volume delivered has been adjusted to the volume at 15 °C (60 °F).

Background/Discussion: At the spring 2005 NTEP Laboratory meeting it was recommended that the location of markings requirement from the LMD code be added to Sections 3.32. LPG and Anhydrous Ammonia Liquid-Measuring Devices and 3.37. Mass Flow Meters. Both codes have other requirements for retail motor-fuel dispensers similar to those in the liquid-measuring devices code. The Laboratories agreed to forward its proposal to the NTETC Measuring Sector for consideration.

At their October 2005 meetings, the NTETC Measuring Sector and the SWMA reviewed the proposal and both agreed to forward the proposal to the Committee for consideration.

334 CRYOGENIC LIQUID-MEASURING DEVICES

334-1 S.2.5. Provision for Sealing and Table S.2.5. Categories of Device and Methods of Sealing

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Modify paragraph S.2.5. and add Table S.2.5. as follows:

S.2.5. Provision for Sealing. - Adequate provision shall be made for ~~applying security seals in such a manner that no~~ an approved means of security (e.g., data change audit trail) or for physically applying a security seal in such a manner that requires the security seal to be broken before an adjustment or interchange may be made of:

- (a) any measurement element,
- (b) any adjustable element for controlling delivery rate when such rate tends to affect the accuracy of deliveries, and
- (c) any automatic temperature or density compensating system.

When applicable Any adjusting mechanism shall be readily accessible for purposes of affixing a security seal.

Audit trails shall use the format set forth in Table S.2.5.

[Nonretroactive as of January 1, 200X]

(Amended 200X)

<u>Table S.2.5. Categories of Device and Methods of Sealing</u>	
<u>Category of Device</u>	<u>Method of Sealing</u>
<u>Category 1: No remote configuration capability.</u>	<u>Seal by physical seal or 2 event counters: 1 for calibration parameters and 1 for configuration parameters.</u>
<u>Category 2: Remote configuration capability, but access is controlled by physical hardware.</u> <u>The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.</u>	<u>[The hardware enabling access for remote communication must be on-site. The hardware must be sealed using a physical seal or an event counter for calibration parameters and an event counter for configuration parameters. The event counters may be located either at the individual measuring device or at the system controller; however, an adequate number of counters must be provided to monitor the calibration and configuration parameters of the individual devices at a location. If the counters are located in the system controller rather than at the individual device, means must be provided to generate a hard copy of the information through an on-site device.]</u>
<u>Category 3: Remote configuration capability access may be unlimited or controlled through a software switch (e.g., password).</u> <u>The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.</u>	<u>An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. A printed copy of the information must be available through the device or through another on-site device. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)</u>

[Nonretroactive as of January 1, 200X]

(Table Added 200X)

Background/Discussion: At its October 2005 meeting, the NTETC Measuring Sector discussed Handbook 44 codes for liquid-measuring devices that do not have specific provisions for electronic sealing (i.e., audit trails), such as the VTM Code or the LPG and Anhydrous Ammonia Metering-Devices Code. At the meeting, manufacturers of these devices stated that they have designed metering systems with electronic sealing capability with remote configuration capability. They are currently seeking an NTEP CC for these systems. Currently the specific Handbook 44 Code for these devices does not address electronic sealing, but it is recognized in the General Code and under the provisions of G-A.3. Special and Unclassified Equipment. Accordingly NTEP has made an “ad hoc” decision to apply the criteria in the LMD code to these devices. The manufacturers would prefer that specific language similar to that in the LMD Code be applied to the VTM and the LPG and Anhydrous Ammonia Metering-Devices Codes. During the discussion, the Sector concluded that some of these new applications and other applications currently in use would have been classified as the former Category 2 device. The Sector agreed that the decision to remove Category 2 from the LMD Code and the MFM Code should be reversed and that provisions for electronic sealing should be added to all appropriate liquid-measuring devices codes as proposed in items 330-3, 331-2, 332-1, 334-1, 335-1, and 338-1. The Sector agreed to forward that proposal to the Committee for consideration.

335 MILK METERS

335-1 S.2.3. Provision for Sealing and Table S.2.3. Categories of Device and Methods of Sealing

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Modify S.2.3. and add new Table S.2.3. as follows:

S.2.3. Provision for Sealing. - Adequate provision shall be made for ~~applying security seals to the adjustment mechanism and the register.~~ *an approved means of security (e.g., data change audit trail) or for physically applying a security seal in such a manner that requires the security seal to be broken before an adjustment may be made of:*

(a) any measurement element, and

(b) any adjustable element for controlling delivery rate, when such rate tends to affect the accuracy of deliveries.

When applicable the adjusting mechanism shall be readily accessible for purposes of affixing a security seal.

Audit trails shall use the format set forth in Table S.2.3.
[Nonretroactive as of January 1, 200X]

<u>Table S.2.3. Categories of Device and Methods of Sealing</u>	
<u>Category of Device</u>	<u>Method of Sealing</u>
<u>Category 1: No remote configuration capability.</u>	<u>Seal by physical seal or 2 event counters: 1 for calibration parameters and 1 for configuration parameters.</u>
<u>Category 2: Remote configuration capability, but access is controlled by physical hardware.</u> <u>The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.</u>	<u>[The hardware enabling access for remote communication must be on-site. The hardware must be sealed using a physical seal or an event counter for calibration parameters and an event counter for configuration parameters. The event counters may be located either at the individual measuring device or at the system controller; however, an adequate number of counters must be provided to monitor the calibration and configuration parameters of the individual devices at a location. If the counters are located in the system controller rather than at the individual device, means must be provided to generate a hard copy of the information through an on-site device.]</u>
<u>Category 3: Remote configuration capability access may be unlimited or controlled through a software switch (e.g., password).</u> <u>The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.</u>	<u>An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. A printed copy of the information must be available through the device or through another on-site device. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)</u>

[Nonretroactive as of January 1, 200X]
(Table Added 200X)

Background/Discussion: At its October 2005 meeting, the NTETC Measuring Sector discussed NIST Handbook 44 codes for liquid-measuring devices that do not have specific provisions for electronic sealing (i.e., audit trails), such as the VTM Code or the LPG and Anhydrous Ammonia Metering-Devices Code. At the meeting, manufacturers of these devices stated that they have designed metering systems with electronic sealing capability with remote configuration capability. They are currently seeking an NTEP Certificate CC for these systems. Currently, the specific NIST Handbook 44 code for these devices does not address electronic sealing, but it is recognized in the General Code and under the provisions of G-A.3. Special and Unclassified Equipment. Accordingly NTEP has made an “ad hoc” decision to apply the criteria in the LMD Code to these devices. The manufacturers would prefer that specific language similar to that in the LMD Code be applied to the VTM and the LPG and Anhydrous Ammonia Metering-Devices Codes. During the discussion, the Sector concluded that some of these new applications and other applications currently in use would have been classified as the former Category 2 device. The Sector agreed that the decision to remove Category 2 from the LMD Code and the MFM Code should be reversed and that provisions for electronic sealing should be added to all appropriate liquid-measuring devices codes as proposed in items 330-3, 331-2, 332-1, 334-1, 335-1, and 338-1. The Sector agreed to forward that proposal to the NCWM S&T Committee for consideration.

336 WATER METERS**336-1 Table N.4.2. Flow Rate and Draft Size for Water Meters Special Tests**

Source: Carryover Item 336-1. (This item originated from the Northeastern Weights and Measures Association (NEWMA) and first appeared on the Committee's 2005 agenda.)

Recommendation: Amend Table N.4.2. as follows:

Table N.4.2. Flow Rate and Draft Size for Water Meters Special Tests						
Meter size (inches)	Intermediate Rate			Minimum Rate		
	Rate of flow (gal/min)	Meter indication/Test Draft		Rate of flow (gal/min)	Meter indication/Test Draft	
		gal	ft³		Gal	ft³
Less than or equal to 5/8	2	10	1	1/4	5 <u>10</u>	1
3/4	3	10	1	1/2	5 <u>10</u>	1
1	4	10	1	3/4	5 <u>10</u>	1
1 1/2	8	50	5	1 1/2	10	1
2	15	50	5	2	10	1
3	20	50	5	4	10	1
4	40	100	10	7	50 <u>100</u>	5
6	60	100	10	12	50 <u>100</u>	5

(Table Added 2003) (**Amended 200X**)

Discussion/Background: At the fall 2004 NEWMA meeting, a manufacturer submitted the above proposal. The manufacturer stated that a test draft of 5 gallons is not large enough to provide repeatability for dial indicating water meters sized 1 inch and smaller. The dial indicator for these devices has 100 graduations of 1/10 gallon, which means one complete revolution equals 10 gallons. The effect of parallax on the reading and gear backlash both contribute to the lack of repeatability of indications when using a 5-gallon test draft. The manufacturer recommended that any test of the device include, at a minimum, at least one complete revolution of the dial indicator. None of the jurisdictions represented at the NEWMA meeting routinely test water meters; therefore, they could not provide any input on the technical merits of the proposal. However, NEWMA agreed to forward the proposal to the Committee for consideration.

At the 2005 NCWM Interim Meeting, the only concern the Committee heard was that the time required for some tests would increase significantly if the current test draft size were doubled. The manufacturer that submitted the proposal to NEWMA was not at the Interim Meeting. The Committee agreed to make the proposal an information item to provide the opportunity for review and comment from the regional associations, especially jurisdictions routinely conducting water meter tests. If additional support and comments were not received, the Committee may withdraw this item.

At the 2005 NCWM Annual Meeting, there was no discussion on this item.

At its September 2005 Annual Meeting, the WWMA heard comments opposing the proposal. Since no data or comments were presented to support the proposal, the WWMA recommends this item be withdrawn.

At its October 2005 Meeting, NEWMA continued to support this proposal. Attached below is a portion of the submitter's original documentation package submitted to NEWMA.

"For water meters sized 5/8", 3/4" and 1" indicating in U.S. gallons, a test draft of only 5 gallons CANNOT give proper resolution and is inconsistent with good metering practice that says that test drafts should be selected to yield nominally whole revolutions of the test dial. Only 50 dial divisions are passed utilizing this test draft size. Normal reading

parallax and gear backlash would yield resolution of ONLY $\pm 1.5\%$ under the best conditions. Handbook 44 and good testing practice suggests that a resolution of $1/3^{\text{rd}}$ of the normal tolerance band is needed.”

337 MASS FLOW METERS

337-1 S.3.5. Provision for Sealing and Table S.3.5. Categories of Devices and Methods of Sealing

Recommendation: Modify Table S.3.5. as follows:

<i>Table S.3.5. Categories of Device and Methods of Sealing</i>	
<i>Category of Device</i>	<i>Method of Sealing</i>
Category 1: No remote configuration capability.	Seal by physical seal or 2 event counters: 1 for calibration parameters and 1 for configuration parameters.
<p>[Category 2 applies to only devices manufactured prior to January 1, 2005. Devices with remote configuration capability manufactured after that date must meet the sealing requirements outlined in Category 3. Devices without remote configuration capability manufactured after that date must meet the minimum criteria outlined in Category 1].</p> <p>Category 2: Remote configuration capability, but access is controlled by physical hardware.</p> <p>The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.</p>	<p>[The hardware enabling access for remote communication must be on-site. The hardware must be sealed using a physical seal or an event counter for calibration parameters and an event counter for configuration parameters. The event counters may be located either at the individual measuring device or at the system controller; however, an adequate number of counters must be provided to monitor the calibration and configuration parameters of the individual devices at a location. If the counters are located in the system controller rather than at the individual device, means must be provided to generate a hard copy of the information through an on-site device.]*</p> <p>[*Nonretroactive as of January 1, 1996]</p>
<p>Category 3: Remote configuration capability access may be unlimited or controlled through a software switch (e.g., password).</p> <p>[Nonretroactive as of January 1, 1995]</p> <p>The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.</p> <p>[Nonretroactive as of January 1, 2001]</p> <p>Nonretroactive as of January 1, 2005, all devices with remote configuration capability must comply with the sealing requirements of Category 3.</p>	<p>An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. A printed copy of the information must be available through the device or through another on-site device. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)</p>

Nonretroactive as of January 1, 1995]

(Table Added 1995) (Amended 1995, 1998, and 1999, and 200X)

Background/Discussion: At its October 2005 meeting, the NTETC Measuring Sector discussed NIST Handbook 44 codes for liquid-measuring devices that do not have specific provisions for electronic sealing (i.e., audit trails), such as the VTM Code or the LPG and Anhydrous Ammonia Metering-Devices Code. At the meeting, manufacturers of these devices stated that they have designed metering systems with electronic sealing capability with remote configuration capability. They are currently seeking an NTEP CC for these systems. Currently the specific NIST Handbook 44 code for these devices does not address electronic sealing, but it is recognized in the General Code and under the provisions of G-A.3. Special and Unclassified Equipment. Accordingly NTEP has made an “*ad hoc*” decision to apply the criteria in the LMD code to these devices. The manufacturers, however, would prefer that specific language similar to that in the LMD Code be applied to the VTM and the LPG and Anhydrous Ammonia Metering-Devices Codes. During the

discussion, the Sector concluded that some of these new applications and other applications currently in use would have been classified as the former Category 2 device. The Sector agreed that the decision to remove Category 2 from the LMD Code and the MFM Code should be reversed and that provisions for electronic sealing should be added to all appropriate liquid-measuring devices codes as proposed in items 330-3, 331-2, 332-1, 334-1, 335-1, and 338-1. The Sector agreed to forward that proposal to the Committee for consideration.

337-2 S.4.1. Diversion of Measured Product

Source: Central Weights and Measures Association (CWMA)

Recommendation: Modify paragraph S.4.1. as follows:

S.4. Discharge Lines and Valves.

S.4.1. Diversion of Measured Product. - No means shall be provided by which any measured product can be diverted from the measuring instrument. However, two or more delivery outlets may be permanently installed and operated simultaneously, provided that any diversion of flow to other than the intended receiving receptacle cannot be readily accomplished or is readily apparent. Such means include physical barriers, visible valves or indications that make it clear which outlets are in operation, and explanatory signs if deemed necessary.

~~A manually controlled~~ **An** outlet that may be opened for purging or draining the measuring system, or for recirculating product if recirculation is required in order to maintain the product in a deliverable state, shall be permitted. Effective means shall be provided to prevent the passage of liquid through any such outlet during normal operation of the measuring system and to inhibit meter indications (or advancement of indications) and recorded representations while the outlet is in operation.

(Amended 2002 **and 200X**)

Background/Discussion: The CWMA noted that the requirements in paragraph S.3.1. of Section 3.30 Liquid Measuring Devices and paragraph S.4.1. Diversion of Measured Product of Section 3.37 Mass Flow Meters in NIST Handbook 44 (2005) are not consistent. Paragraph S.3.1. prohibits manual valves for re-circulating product or purging or draining the measuring system except for foods and agri-chemicals. On the other hand Paragraph S.4.1. permits manual valves but appears to ban automatic valves by omission, and makes no distinction for types of products measured as long as the system meets the specified requirements.

Cold weather and physical characteristics make recirculation necessary for a number of products not currently allowed in paragraph S.3.1. of Section 3.30. (#6 Fuel oil and B100 Biodiesel, for example). Although liquid-measuring devices exist which have NTEP CCs for these high viscosity products, the current wording of NIST Handbook 44 restricts vendors of these products to using mass flow technology if they wish to recirculate their product in order to keep it in a deliverable state. This appears to be the unintended result of the fact that the two codes were written at different times with different input from industry lobbies. The CWMA recommends that retailers of these products not be restricted to using only mass flow meters for commercial measurements if other suitable technologies are available. Likewise, both manual and automatic valves are suitable for recirculating product in discharge lines of these devices, and the use of either type should be allowed.

At the CWMA 2005 Interim Meeting, it was noted that adopting this proposal will create a logical and consistent standard of enforcement for mass flow meters and liquid-measuring devices, which are used for identical applications and products, thus ending an unintentional bias in favor of one technology over the other.

By stating the uniform guidelines for when it is acceptable to allow purge lines and recirculation lines (i.e., the necessity for such lines is to keep the product in a deliverable state), this proposal would eliminate the need for industry to petition the NCWM for each product which requires such special handling. The CWMA agreed to forward the proposal with the recommendation that it be a voting item on the Committee's 2006 agenda.

(See also item 330-4)

337-3 S.5.1. Location of Marking Information; Retail Motor-Fuel Dispensers

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Add a new paragraph S.5.1. as follows and renumber subsequent paragraphs:

S.5.1. Location of Marking Information; Retail Motor-Fuel Dispensers. - The required marking information in the General Code, Paragraph G-S.1. Identification shall appear as follows:

- (a) within 60 cm (24 in) to 150 cm (60 in) from the base of the dispenser;
- (b) either internally and/or externally provided the information is permanent and easily read; and
- (c) on a portion of the device that cannot be readily removed or interchanged (i.e., not on a service access panel).

Note: The use of a dispenser key or tool to access internal marking information is permitted for Retail Liquid-Measuring Devices.

[*Nonretroactive as of January 1, 200X]

(Added 200X)

Background/Discussion: At the 2005 meeting of the NTEP Laboratories it was recommended that the location of markings requirement from the LMD Code be added to Sections 3.32. LPG and Anhydrous Ammonia Liquid-Measuring Devices and 3.37. Mass Flow Meters. Both codes have other requirements for retail motor-fuel dispensers similar to those in the LMD Code. The Laboratories agreed to forward its proposal to the NTETC Measuring Sector for consideration.

At their October 2005 meetings, the NTETC Measuring Sector and the SWMA reviewed the proposal and both agreed to forward it to the Committee for consideration.

338 CARBON DIOXIDE LIQUID-MEASURING DEVICES

338-1 S.2.5. Provision for Sealing and Table S.2.5. Categories of Device and Methods of Sealing

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Modify paragraph S.2.5. and add new Table S.2.5. Categories of Device and Methods of Sealing as follows:

S.2.5. Provision for Sealing. - Adequate provision shall be made for ~~applying security seals in such a manner that no~~ an approved means of security (e.g., data change audit trail) or for physically applying a security seal in such a manner that requires the security seal to be broken before an adjustment or interchange may be made of:

- (a) any measurement element,
- (b) any adjustable element for controlling delivery rate when such rate tends to affect the accuracy of deliveries, and
- (c) any automatic temperature or density compensating system.

When applicable, Any adjusting mechanism shall be readily accessible for purposes of affixing a security seal.

Audit trails shall use the format set forth in Table S.2.5.

(Amended 200X)

<u>Table S.2.5. Categories of Device and Methods of Sealing</u>	
<u>Category of Device</u>	<u>Method of Sealing</u>
<u>Category 1: No remote configuration capability.</u>	<u>Seal by physical seal or 2 event counters: 1 for calibration parameters and 1 for configuration parameters.</u>
<u>Category 2: Remote configuration capability, but access is controlled by physical hardware.</u> <u>The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.</u>	<u>[The hardware enabling access for remote communication must be on-site. The hardware must be sealed using a physical seal or an event counter for calibration parameters and an event counter for configuration parameters. The event counters may be located either at the individual measuring device or at the system controller; however, an adequate number of counters must be provided to monitor the calibration and configuration parameters of the individual devices at a location. If the counters are located in the system controller rather than at the individual device, means must be provided to generate a hard copy of the information through an on-site device.]</u>
<u>Category 3: Remote configuration capability access may be unlimited or controlled through a software switch (e.g., password).</u> <u>The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.</u>	<u>An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. A printed copy of the information must be available through the device or through another on-site device. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)</u>

[Nonretroactive as of January 1, 200X]

(Table Added 200X)

Background/Discussion: At its October 2005 meeting, the NTETC Measuring Sector discussed NIST Handbook 44 codes for liquid-measuring devices that do not have specific provisions for electronic sealing (i.e., audit trails), such as the VTM Code or the LPG and Anhydrous Ammonia Metering-Devices Code. At the meeting, manufacturers stated that they have designed metering systems with electronic sealing capability with remote configuration capability. They are currently seeking an NTEP CC for these systems. Currently the specific NIST Handbook 44 code for these devices does not address electronic sealing, but it is recognized in the General Code and under the provisions of G-A.3. Special and Unclassified Equipment. Accordingly NTEP has made an “*ad hoc*” decision to apply the criteria in the LMD Code to these devices. The manufacturers, however, would prefer that specific language similar to that in the LMD Code be applied to the VTM and the LPG and Anhydrous Ammonia Metering-Devices Codes. During the discussion, the Sector concluded that some of these new applications and other applications currently in use would have been classified as the former Category 2 device. The Sector agreed that the decision to remove Category 2 from the LMD Code and the MFM Code should be reversed and that provisions for electronic sealing should be added to all appropriate liquid-measuring devices codes as proposed in items 330-3, 331-2, 332-1, 334-1, 335-1, and 338-1. The Sector agreed to forward that proposal to the Committee for consideration.

360 OTHER ITEMS**360-1 International Organization of Legal Metrology (OIML) Report**

Many issues before the OIML, the Asian-Pacific Legal Metrology Forum (APLMF), and other international groups are within the purview of the Committee. Additional information on OIML activities will appear in the 2006 Board of Directors Interim Agenda and on the OIML website at <http://www.oiml.org>. WMD staff will provide updates on OIML activities during the open hearing session at the 2006 NCWM Interim Meeting. For more information on specific OIML-related device activities contact the WMD staff listed in the table below:

NIST Weights and Measures Division Contact List				
Staff	Telephone	Email	Responsibilities	Postal Mail or Fax
Dr. Charles Ehrlich (ILM)	(301) 975-4834	charles.ehrlich@nist.gov	Mutual Acceptance Arrangement (MAA) & Uncertainty in Measurement	NIST WMD 100 Bureau Dr MS 2600 Gaithersburg, MD 20899-2600 Tel: (301) 975- 4004 Fax: (301) 926-0647
Steven Cook (LMD)	(301) 975-4003	steven.cook@nist.gov	R76 “Non-automatic Weighing Instruments” R60 “Load Cells” R50 “Continuous totalizing automatic weighing instruments (belt weighers)” R51 “Checkweighing and weight grading machines”	
Richard Harshman (LMD)	(301) 975-8107	richard.harshman@nist.gov	R134 “Weighing Road Vehicles In- Motion” R160 “Automatic rail- weighbridges” R107 “Discontinuous totalizing automatic weighing instruments”	
Diane Lee McGowan (LMD)	(301) 975-4405	diane.lee@nist.gov	R 59 “Grain Moisture Meters” & “Near Infrared Grain Analyzers” TC17/SC8 “Instruments for Quality Analysis of Agricultural Products”	
Ralph Richter (ILM)	(301) 975-3997	ralph.richter@nist.gov	R 117 & R 105 “Measuring Systems for Liquids Other Than Water (includes Direct Mass)”	
Wayne Stiefel (ILM)	(301) 975-4011	s.stiefel@nist.gov	Software in Legal Metrology R6, R31, and R32 “Gas Meters ” R49 “Water Meters”	
Dr. Ambler Thompson (ILM)	(301) 975-2333	ambler@nist.gov	D1 “Electronic Measuring Instruments,” D19 & D20 “Metrological Control of Measuring Instruments: Type Approval and Verification” R46 “Electrical Energy Meters”	
Juana Williams (LMD)	(301) 975-3989	juana.williams@nist.gov	R21-“Taximeters” Electronic Taximeters	
LMD - Legal Metrology Devices Group ILM - International Legal Metrology Group				

360-2 Appendix A – Fundamental Considerations Section 11 Health and Safety Considerations

Source: Western Weights and Measures Association (WWMA)

Recommendation: Add a new Section 11. Health and Safety Considerations during inspection to NIST Handbook 44 Appendix A as follows:

11. Health and Safety Considerations

11.1. Health and Safety. - This handbook cannot address all of the health and safety issues associated with device inspections. During the inspection and testing of weighing and measuring equipment safety is a major consideration in conducting inspections. If the inspection cannot be conducted in a safe manner, the inspector will terminate the inspection.

The inspector is responsible for determining appropriate safety and health hazards before beginning an inspection. The inspector should make himself/herself familiar with all warnings associated with the equipment and facility prior to conducting any inspection and must comply with Federal, state, local and agency laws, regulations and policies in effect at the time of the inspection. Inspectors will bring hazards or deficiencies to the attention of the business owner/operator and to the appropriate Weights and Measures supervisor. It is only through good judgment and conscientious adherence to safety regulations and procedures on a regular basis that the inspector can decrease the likelihood of personal injury and damage to property and equipment.
(Added 200X)

Discussion: At its September 2005 Annual Meeting, the WWMA reviewed a proposal to add safety considerations to the General Code section of NIST Handbook 44. While the WWMA supported the concept, it believed that Appendix A, Fundamental Consideration was a more appropriate place to add the proposed language. Therefore, the WWMA submitted the proposal to the Committee for consideration.

At their 2005 fall meetings, the remaining regional associations reviewed the WWMA proposal. The CWMA did not believe that safety is a NIST Handbook 44 issue. NEWMA supported the proposal as a developing item and recommended the NCWM L&R Committee consider a similar proposal for inclusion in NIST Handbook 130 “Uniform Laws and Regulations...” The SWMA recommends the item be withdrawn because safety considerations are already adequately addressed in the EPOs.

360-3 Add International Terms that are Synonymous to NIST Handbook 44 Terms in Appendix D; Definitions

Source: Carryover Item 360-4. (This item originated from the Northeastern Weights and Measures Association (NEWMA) and first appeared on the Committee’s 2002 agenda.)

Discussion: Many NIST Handbook 44 and OIML technical concepts and procedures are in harmony, yet there are significant differences in terminology used by the two organizations. The harmonization of language is not necessary to obtain uniform legal requirements provided the intent of the requirements are essentially equivalent; however, improvements should be considered to revise language that is confusing or has the potential for misinterpretation. Currently, the U.S. National Work Group (USNWG) on R76 “Non-automatic Weighing Instruments” is working on a proposal to amend NIST Handbook 44 Appendix D, Definitions to include international terminology that is synonymous with Handbook 44 definitions. This item is intended to familiarize the public and private sectors with the proposed approach to modify Appendix D. The USNWG will identify terms or definitions that are equivalent to international vocabulary by placing the corresponding OIML term in parentheses adjacent to the NIST Handbook 44 term.

The further development of this proposal to amend Appendix D will also clarify terminology for international participants in the proposed Mutual Acceptance Arrangement (MAA), where it is imperative that all affected parties are aware of and understand each other’s requirements. Terms can have an entirely different meaning in NIST Handbook 44 than they do in R76. NIST Handbook 44 is also inconsistent in the use of many terms such as “division,” “increment,”

and “interval.” One additional goal is to eliminate any confusion about other frequently used terms such as “device,” “element,” “mechanism,” “scale,” “weigher,” and “balance.”

Several regional weights and measures associations stated their positions on the proposal. NEWMA supports this item. The WWMA requested the proposal remain an information item. The CWMA believes this is not a field issue and indicated that the issue is covered in NCWM Publication 14; therefore, it recommends that it be withdrawn from the Committee’s agenda.

360-4 Developing Issues

The NCWM established a category of items called “Developing Issues” as a mechanism to share information about emerging issues which have merit and are of national interest, but that have not received sufficient review by all parties affected by the proposal or that may be insufficiently developed to warrant review by the Committee. The developing issues are currently under review by at least one regional association or technical committee.

Developing issues are listed in Appendix A according to the specific NIST Handbook 44 Code section under which they fall. Periodically, proposals will be removed from the developing item agenda without further action because the submitter recommends that it be withdrawn. Any remaining proposals will be renumbered accordingly.

The Committee encourages interested parties to examine the proposals included in Appendix A and send their comments to the contact listed in each item. The Committee asks that the regional associations and NTETC Sectors continue their work to fully develop each proposal. Should an association or Sector decide to discontinue work on an item, the Committee asks that it be notified.

Clark Cooney, Oregon, Chairman (1)

Carol P. Fulmer, South Carolina (3)

Todd R. Lucas, Ohio (4)

Brett Saum, San Luis Obispo County, California (5)

Michael J. Sikula, New York (2)

Ted Kingsbury, Canada, Technical Advisor

Richard Suiter, NIST, Technical Advisor

Juana Williams, NIST, Technical Advisor

Specifications and Tolerances Committee

Appendix A

Item 360-4: Developing Issues

Part 1, General Code G-UR.4.1.1. Proper Operating Conditions for Retail Motor-Fuel Devices

Source: Central Weights and Measures Association (CWMA)

Recommendation: Add a new paragraph G-UR.4.1.1. as follows:

G-UR.4.1.1. Proper Operating Condition for Retail Motor-Fuel Devices. - The equipment ~~A device~~ will not be considered maintained in proper operating condition if one or more of the following conditions are met.

(a) Multiple (four or more) devices, defined as grades or types of fuel, in service at a single place of business shall not be considered in proper operating condition under any of the following:

(1) The calculated average error of all devices is in favor of the device owner/user by more than one-third the maintenance tolerance.

(2) Any particular grade or type of fuel averages in favor of the device owner/user by more than one-third the maintenance tolerance.

(b) Special tests should not be included in calculations unless the special test alone is in favor of the device owner/user by more than one-third the maintenance tolerance.

(Added 200X)

Discussion: At its 2005 CWMA Interim Meeting the association membership reviewed a proposal for adding specific language to aid field officials in determining if retail motor-fuel dispensers are being maintained in accordance with G-UR.4.1. Maintenance of Equipment. The CWMA believed the proposal has merit and agreed to forward it to the Committee as a developing issue.

Part 2, Item 1 Scales: S.2.1.7. Tare Rounding on a Multiple Range Scale

Source: Southern Weights and Measures Association (SWMA)

Recommendation: Add new paragraph S.2.1.7. as follows:

S.2.1.7. Tare Rounding on a Multiple Range Scale. - A multiple range scale with tare capability must indicate and record values that satisfy the equation: $\text{net} = \text{gross} - \text{tare}$

and round the tare value up to the larger division size when entering the larger division.

(Added 200X)

Discussion: Currently, there may be a conflict between NIST Handbook 44 requirements and NCWM Publication 14 policy for rounding tare values on multiple range scales. NIST Handbook 44 General Code paragraph G-S.5.2.2.(c) Digital Indication and Representation requires that digital values round off to the nearest minimum unit that can be indicated or recorded. Also in question is a possible conflict with NIST Handbook 130 guidelines which specify that in no case shall rounded values result in overstating the net quantity. NTEP policy permits the operation of tare on a multiple range scales to round down thus overstating the quantity. The proposal was developed to eliminate any conflict in the operation of the tare function on multiple range scales. NTEP is also revising its tare criteria to ensure there is no further conflict with NIST Handbook 44. The SWMA recognizes that OIML permits rounding tare down, but believes that customers are not able to make adjustments in unit prices for overhead whereas businesses can adjust the price to compensate for expenses and losses.

To comment on this proposal contact Carol Fulmer, South Carolina Department of Agriculture, Weights and Measures by telephone at (803) 737-9690 or at cfulmer@scda.sc.gov or by fax at (803) 737-9703.

Part 3, Item 1 Belt-Conveyor Scale Systems: UR.3.2.(c) Maintenance; Zero Load Tests

Source: Western Weights and Measures Association (WWMA)

Recommendation: Modify UR.3.2.(c) as follows:

UR.3.2. Maintenance. - Belt-conveyor scales and idlers shall be maintained and serviced in accordance with manufacturer's instructions and the following:

- (c) ~~Zero-load tests, S~~ simulated load tests or material tests, ~~and zero-load tests~~ shall be conducted at periodic intervals between official tests in order to provide reasonable assurance that the device is performing correctly.

(Amended 200X)

The action to be taken as a result of the zero-load tests is as follows:

(Added 2000X)

- if the change in the zero-load reference is greater than ± 0.25 %, inspect the conveyor and weighing area to be sure it conforms to UR.2 and correct any deficiencies;
(Added 200X)
- if the change in the zero-load reference is greater than 0.5 % in a 24-hour period, inspect the conveyor and weighing area to be sure it conforms to UR.2 Installation Requirements, correct any deficiencies, and repeat the zero-load test.
(Added 200X)

The action to be taken as a result of the material tests or simulated load tests is as follows:

~~(Amended 2002)~~

- if the error is less than 0.25 %, no adjustment is to be made;
- if the error is at least 0.25 % but not more than 0.6 %, inspect the conveyor and weighing area to be sure it conforms to UR.2 Installation Requirements, correct any deficiencies, and repeat the simulated or materials test.
(Amended 1991 and 200X)

An adjustment to the span calibration may be made if no deficiencies were identified during the above inspection, any correction to the installation did not result in errors less than or equal to ± 0.25 %. The official with statutory authority is notified if an adjustment is made to the span calibration;

(Amended 1991 and 200X)

- if the error is greater than 0.6 % but does not exceed 0.75 %, inspect the conveyor and weighing area to be sure it conforms to UR.2 Installation Requirements, correct any deficiencies, and repeat the simulated or materials test;

Adjustments to the span calibration shall be made only by a competent service person and the official with statutory authority shall be notified if no deficiencies were identified during the above inspection and any correction to the installation did not result in errors less than or equal to ± 0.25 %. After such an adjustment to the span calibration, if the results of a subsequent test require adjustment in the same direction, the official with statutory authority shall be notified and an official test shall be conducted;

(Amended 1991 and 200X)

- if the error is greater than 0.75 %, an official test is required.
(Amended 1987 and 200X)

Discussion: NIST Handbook 44 gives limited guidance on what to do with zero-load test results. In addition to belt loss, the operator of the scale may need to make physical adjustments to the belt-conveyor system. For example, a dirty scale structure or a worn belt scraper will increase the zero reference number and the test results may exceed tolerances.

The scale user/owner has to protect his interest between weighing transactions. At present, some belt-conveyor systems may have error greater than 0.5 % in zero reference in 24 hours. The belt is part of tare (net load) on any empty running system, and the system must be maintained to within tolerance at all times.

The WWMA indicated that, based on comments heard in September 2005, only part of the proposal has merit. Consequently, the WWMA recommends the proposal become a developing item.

To comment on this proposal, contact Brett Saum, San Luis Obispo County Weights and Measures California, by telephone at (805) 781-5922, by fax at (805) 781-1035, or at bsaum@co.slo.ca.us.

Part 4, Item 1 Automatic Weighing Systems: Temperature Limits

Source: National Type Evaluation Technical Committee (NTETC) Weighing Sector

Recommendation: The Weighing Sector asks for the Committee's interpretation of how to apply marking requirements for temperature limits based on the thermal conditions developed during type evaluation laboratory testing and those conditions that exist in real-world environments. The Sector also questions why paragraphs to address instances where equipment operates in temperatures that are outside of the -10 °C to 40 °C temperature range such as Scales Code T.N.2.3. Subsequent Examination Verification is not included in all weighing code sections. The Sector also noted there are inconsistencies in the language that specifies temperature requirements throughout the weighing code sections. The Sector agreed this is an important issue, yet recognizes the Committee may require time to research the codes and policies established on this topic. Consequently, the Sector recommended this as a developing item.

To comment on this proposal, contact Steve Cook, NIST Technical Advisor to the NTETC Weighing Sector, at steven.cook@nist.gov, by fax at (301) 926-0647 or at NIST WMD, 100 Bureau Drive MS 2600, Gaithersburg, MD 20899-2600.

